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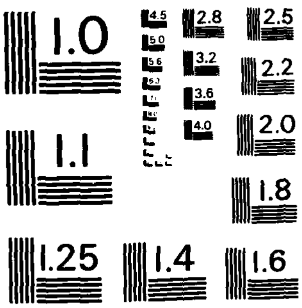

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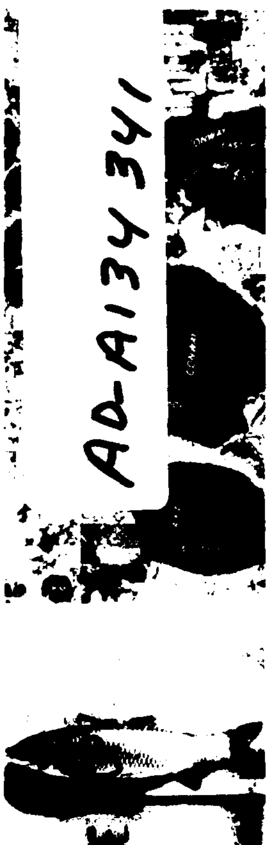

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LARGE-SCALE OPERATIONS MANAGEMENT TEST OF USE OF THE WHITE AMUR FOR CONTROL OF PROBLEM AQUATIC PLANTS

Reports 2 and 3

FIRST AND SECOND YEAR POSTSTOCKING RESULTS

Volume V

The Herpetofauna of Lake Conway, Florida: Community Analysis

by

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ENVIRONMENTAL LABORATORY

LARGE-SCALE OPERATIONS MANAGEMENT TEST OF
USE OF THE WHITE AMUR FOR CONTROL OF
PROBLEM AQUATIC PLANTS

Report 1: Baseline Studies

Volume I: The Aquatic Macrophytes of Lake Conway, Florida

Volume II: The Fish, Mammals, and Waterfowl of Lake Conway, Florida

Volume III: The Plankton and Benthos of Lake Conway, Florida

Volume IV: Interim Report on the Nitrogen and Phosphorus Loading Characteristics of the Lake Conway, Florida, Ecosystem

Volume V: The Herpetofauna of Lake Conway, Florida

Volume VI: The Water and Sediment Quality of Lake Conway, Florida

Volume VII: A Model for Evaluation of the Response of the Lake Conway, Florida, Ecosystem to Introduction of the White Amur

Volume VIII: *Summary of Baseline Studies and Data*

Report 2: First Year Poststocking Results

Report 3: Second Year Poststocking Results

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This report summarizes the first and second year poststocking results of the Large-Scale Operations Management Test (LSOMT) on the amphibian and reptile populations of Lake Conway, Florida. Data for the 15-month baseline study from June 1977 through September 1978 are compared with those from the two-year poststocking study from October 1978 through September 1980.

During the study 11,928 individuals of 12 species of amphibians and 17 species of reptiles were recorded from Lake Conway. South Pool had the

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greatest species diversity (23 species) followed by Middle and East Pools and Lake Gatlin with 20 species, and West Pool with 17 species. Approximately 90 percent of the species known from Lake Conway were recorded with the first 2,900 specimens (24 percent) sampled, and this occurred during the first nine months of the three-year study. The turtle Sternotherus odoratus was the most common species on Lake Conway and accounted for 29.5 percent of the total sample. Of the 29 species recorded in Lake Conway, 14 (48 percent) were recorded in all pools. These 14 species included the most common amphibians and reptiles in the lake and accounted for 95.3 percent of all records.

Thirteen species were identified as functionally important species in the community dynamics of the Lake Conway herpetofauna. Two large salamanders decreased significantly during the study. In contrast to the salamanders, frogs, as documented by the number of calling males, showed an overall increase in density during the study. The density of alligators decreased and that of most turtles declined significantly through the study. The density of snakes also declined dramatically on the lake. Human disturbance of several types was identified as the major causative factor associated with the population declines of many species on Lake Conway. However, reductions in density or changes in feeding activity and habitat use of one salamander (Siren lacertina) and three turtles (Pseudemys floridana, Pseudemys nelsoni, and Sternotherus odoratus) were directly the result of or were affected by the feeding activity of the white amur.

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PREFACE

The work described in this volume was performed under Contract No. DACW39-76-C-0047 between the U. S. Army Engineer Waterways Experiment Station (WES), Vicksburg, Miss., and the University of South Florida, Tampa, Fla. The work was sponsored by the U. S. Army Engineer District, Jacksonville, and by the Office, Chief of Engineers, U. S. Army, Washington, D. C. The Museum Section, U. S. Fish and Wildlife Service, Washington, D. C., provided technical assistance and personnel support for part of the radiotelemetry study of amphibians and reptiles.

This is the fifth of eight volumes that constitute a series of reports documenting a Large-Scale Operations Management Test of use of the white amur for control of problem aquatic plants in Lake Conway, Florida. Report 1 of the series presented the results of the baseline studies. This report combines the results of the first and second year poststocking studies in a community analysis. A third report presents the species accounts from the three-year study. Data from the radiotelemetry study will be published elsewhere.

This volume was written by Dr. Roy W. McDiarmid, U. S. Fish and Wildlife Service, National Museum of Natural History, Washington, D. C., and Mr. G. Thomas Bancroft and Mr. J. Steve Godley, Department of Biology, University of South Florida, Tampa, Fla. The authors acknowledge with thanks Messrs. W. E. Ackerman and M. Lopez and Mdms. D. T. Gross, N. N. Rojas, and D. A. Sutphen for help in the field, Barbara and Tom Davis for hospitality and use of a cottage as a field laboratory, and Marianna B. Scott for help in preparing this report.

The work was monitored at WES in the Environmental Laboratory (EL), Dr. John Harrison, Chief. The study was under the general supervision of Mr. B. O. Benn, Chief, Environmental Systems Division (ESD), EL. Mr. J. L. Decell was Manager, Aquatic Plant Control Research Program, EL. Principal investigators were: Messrs. R. F. Theriot, J. D. Lunz, and E. G. Buglewicz and Dr. A. C. Miller, all of ESD, EL.

Commanders and Directors of WES during the contract period and report preparation were COL J. L. Cannon, CE, COL Nelson P. Conover, CE, and COL Tilford C. Creel, CE. Technical Director was Mr. F. R. Brown.

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CONTENTS

LARGE-SCALE OPERATIONS MANAGEMENT TEST OF USE OF THE WHITE AMUR FOR CONTROL OF PROBLEM AQUATIC PLANTS

FIRST AND SECOND YEAR POSTSTOCKING RESULTS

The Herpetofauna of Lake Conway, Florida: Community Analysis

PART I: INTRODUCTION

1. Beginning in 1975, the U. S. Army Engineer Waterways Experiment Station began planning for a Large-Scale Operations Management Test (LSOMT) to investigate the suitability of the white amur (*Ctenopharyngodon idella*) as a potential biological control for aquatic plants, especially hydrilla (*Hydrilla verticillata*). Because the State of Florida had an aquatic plant problem and was receptive to using the fish under the concept of an LSOMT, Lake Conway near Orlando, Florida, was selected as the study site (Addor and Theriot 1977). Lake Conway is an urban lake consisting of five interconnected pools with a combined surface area of approximately 7.4 km^2. The project was envisioned as consisting of a one-year study for compilation of baseline data (prestocking period) and approximately three years of poststocking study. By September 1976, the following contracts had been awarded and work started: water chemistry and sediment quality--Orange County Pollution Control Authority; aquatic macrophyte populations--Florida Department of Natural Resources; phytoplankton, zooplankton, and benthic invertebrate populations, and an ecosystem model--University of Florida; and fish, aquatic bird, and mammal inventories--Florida Game and Fresh Water Fish Commission. In June of 1977, a contract was awarded to the University of South Florida to characterize and monitor the amphibian and reptile populations.

2. In September of 1977, a monosex population of the white amur was introduced into Lake Conway at an average stocking density of one fish per 0.1 hectare. This value, previously determined from a stocking rate model (Ewel and Fontaine 1979), was designed to control aquatic plant populations, particularly those of hydrilla, in Lake Conway. From this point on (poststocking period), populations were monitored in Lake Conway to evaluate the impact, if any, of the white amur on the component systems of the lake community through September 1980. In September 1979, radiotracking was added

to the project's methodologies to gain insight on movements of the white amur and select species of amphibians and reptiles. Radiotelemetry continued into 1982 for some species of turtles.

3. The herpetofaunal part of the Lake Conway study was designed to accomplish the following objectives:

a. Determine the species of amphibians and reptiles inhabiting Lake Conway.

b. Ascertain the habitat requirements, distribution, ecology, and seasonal activity of each species in the lake system.

c. Establish quantitative baseline population data for the more common or otherwise important species in each of the Lake Conway pools including density by habitat, relative age (size) structure, movements, diel and seasonal activity patterns, growth, reproduction, food habits, and related parameters as deemed feasible.

d. Monitor quantitatively following introduction of the white amur any changes in the species composition of each pool, movements within and between pools, density changes, or other population parameters of the amphibians and reptiles.

e. Determine whether any observed changes are the result, directly or indirectly, of the white amur weed control program.

4. The Baseline Studies Report (Godley et al. 1981) summarized the herpetofaunal work for the 15-month period from June 1977 through September 1978. Although the white amur was introduced into Lake Conway in September 1977, only three months after the amphibian and reptile work began, the data presented in the first report were by necessity considered "baseline" and referred to herein as Study Year 1 (SY1). We are convinced that these first year's data were suitable as a baseline to which subsequent years could be compared because the white amur had little detectable impact on the lake system in the first poststocking year (Schardt et al. 1981; Land 1980). The baseline report included detailed descriptions of the herpetofaunal study sites, sampling methods and techniques, and data collection procedures. This baseline report also provided a list of the amphibian and reptile species encountered on Lake Conway during SY1, analyses of their temporal and spatial densities and distributions, and a composite of those parameters deemed important to understanding community dynamics within the system.

5. This report summarizes our findings for Study Years 2 and 3 (SY2 and SY3). Because of our late start on the LSOMT, our SY2 is the first poststocking period and SY3 is the second poststocking period for the herpetofaunal work. In contrast, our periods of SY2 and SY3 are equivalent to poststocking years two and three of other studies. In this report we update our methodologies, describe new and expanded sampling procedures, and provide a brief history of the permanent study sites during the three study years. The community analyses that examine distributions and densities within and among pools essentially follow those discussed in the Baseline Report. Detailed accounts of each species emphasizing natural history parameters and changes therein through the three-year study are presented separately (Bancroft et al. 1983). Results of the radiotracking study will be available in the doctoral dissertation of J. S. Godley to be filed at the University of South Florida.

PART II: METHODS AND MATERIALS

6. Details of the Lake Conway herpetofaunal sampling programs are provided elsewhere (Godley et al. 1981), and only a brief update and summary of methodologies are presented here. In each pool of the Lake Conway complex one permanent shoreline site (Figure 1) was used for mark and recapture por ation studies; destructive samples for analyses of stomach content and repr ctive condition of selected species of amphibians and reptiles were taken fr ther areas of similar habitat within the lake system. A description the permanent shoreline sites and any habitat changes that occurred at the s during the study is provided in Part III, The Lake Conway Syste he deepwater transects shown in Figure 1 were discontinued after the baseline studies because of extremely low trap success per unit effort (see paragraph 7 of Godley et al. 1981).

7. In general, the herpetofaunal sampling program involved spending three days and two nights every other week on the lake so that each permanent shoreline site was censused by herp-patrols and sampled with funnel traps twice a month (see below). Alternate weeks were spent in the laboratory processing data and gathering reproductive and ecological information from the destructive samples. Brief descriptions of the major sampling methods are discussed below.

Funnel Trapping

8. Funnel traps, 60x30x30 cm, were designed specifically to sample aquatic salamanders, tadpoles, small carnivorous turtles, and several species of aquatic snakes. Most funnel traps were constructed of 3-mm black plastic Vexar netting (DuPont De Memours & Co., Model No. 5-59-V-360-BABK) stretched over welded metal frames with funnel entrances at each end. Some wire mesh (6.35-mm hardware cloth) funnel traps of the same dimensions were used in areas where rice rats (*Oryzomys palustris*) were common and often gnawed holes in the Vexar cover of traps.

9. During the baseline study period funnel traps were set at each permanent shoreline site twice a month for a 24-hr period. Traps were baited with fresh, cut fish. Because we had only half as many traps as sampling stations (N=163), the traps had to be moved to new sites each sampling trip;

each trap move required a considerable expenditure of field time. Beginning in December 1979, funnel traps were set at each site only once a month but for a 48-hr period. The traps were checked and freshly baited each day; animals collected on the first day were processed and usually released the same day. Thus, the total trapping effort remained constant (48 hr/month/trap station) but more field time was available for other activities. Relative density comparisons within and between sites and study years are based on total trap success per total number of trap-days (sum of all traps set per 24-hr periods).

Herp-Patrol

10. All permanent shoreline sites were censused twice a month at night from a 5.33-m johnboat. This censusing technique, termed "herp-patrol," involved the use of an electric trolling motor and two 12-volt, 120,000-candlepower spotlights. The permanent shoreline sites were censused with herp-patrols by motoring slowly along the edge of the littoral zone. One spotlight from the rear of the boat was directed towards the emergent vegetation on the shore side, while the other in the front of the boat was shined on the opposite side in adjacent, open water. A third individual collected animals with a dip net or by hand. The identification, time, location, water depth, vegetation type, substratum, activity, and behavior of all specimens observed or heard calling were recorded on standardized data sheets. All captured individuals were brought to the laboratory and sexed, measured, weighed, marked, and released at their capture point the following day.

11. In the baseline study period herp-patrols on permanent sites were replicated each sampling night with the electric trolling motor and assigned a run number of I or II. The same collecting path and direction were used on each run. The number of males of each frog species calling per 10-m increment of shoreline was recorded on both runs; other species of amphibians and reptiles were captured and processed as reported above. First year results indicated no significant differences in the mean number of calling frogs recorded on run I compared to run II (paired t-tests, Steel and Torrie 1960). However, many turtles eluded capture because of the slow speed and poor mobility of the boat when powered by the trolling motor. To improve capture success but still monitor frog populations, this herp-patrol procedure was

modified slightly in subsequent years: two runs were performed each sampling night but frogs were recorded only on the first run which was done with the electric motor, the second run was accomplished with the 25-hp (18.6 kw) outboard motor at slow speeds. Between-year comparisons of relative densities on permanent sites are based on the number of calling males heard only on run I (frogs only) or the total number of individuals observed per total search time for both runs (all other taxa).

Extended Herp-Patrol

12. As work progressed, three potentially confounding trends in populations of several turtle species on Lake Conway appeared: (1) the number of individuals observed on permanent shoreline sites was decreasing through time, (2) several species apparently had home ranges much larger than the size of the permanent shoreline sites, and (3) many marked turtles had moved off the permanent sites and into nearby areas perhaps in response to repeated capturing. To provide a better understanding of the demography and movements of turtles, the amount of shoreline censused on herp-patrols gradually was expanded in two pools (=extended herp-patrol).

13. In August 1978, the herp-patrol in South Pool was extended from the southern end of the permanent site to the Detwilder outflow canal (Figure 1). In November 1978, a second South Pool extension was initiated from the bridge to the northern end of the site (Figure 1). Thus, beginning in November 1978, herp-patrols in South Pool covered the permanent site and two extensions, or approximately half of the South Pool shoreline. Also, in November 1978, a herp-patrol extension was begun in West Pool, covering the shoreline from the southern end of the West Pool permanent site to the mouth of Gatlin Canal.

14. Extended herp-patrols involved one run at night at slow speeds with the outboard on each of the bimonthly sampling trips to Lake Conway for the remainder of the study. Extended herp-patrols were conducted on the same nights as permanent site herp-patrols but with three differences in methodology: (1) only one run per night was done on each extended herp-patrol while the two-run procedure was continued on permanent sites, (2) calling frogs were not recorded on the extensions, and (3) stinkpots (*Sternotherus odoratus*) captured on the extensions were processed in the boat and immediately released

at the capture site; all other species were brought back to the lab for processing, as was done on all permanent sites.

Selective Herp-Patrol

15. We were concerned that the floy tags used to tag Sternotherus odoratus may have become a significant mortality factor and may have contributed to declines in this species on permanent sites. To control for this possibility, "selective herp-patrols" were established in November 1978 in South Pool and September 1979 in West Pool (Figure 1). Selective herp-patrols were similar in all respects to extended herp-patrols except that on selective herp-patrols individuals of S. odoratus were not captured or marked, only visually censused and recorded. On selective herp-patrols, all other turtle species were captured and processed in the usual manner (see Godley et al. 1981).

Alligator Census

16. The alligator population of the entire Lake Conway complex was estimated every other month using nocturnal censusing procedures previously described in detail (Godley et al. 1981). These procedures provided estimates of the number, location, and approximate sizes of all alligators on Lake Conway. In addition, nesting was monitored by searching all stretches of suitable shoreline for alligator nests and determining the relative success of each nest during the summer nesting season.

Other Methods

17. In addition to the above sampling methods, several other techniques (gill netting, shoreline census, hyacinth sieving, electrofishing) were used for selected species as time and man-power permitted. These techniques and the procedures used for measuring and marking all captured amphibians and reptiles are described elsewhere (Godley et al. 1981). Late in the study we successfully used "muddling" to capture large turtles beneath dense waterhyacinth mats. Specimens were located by hand in a random search beneath mats of waterhyacinth often anchored by emergent cattails. Most success was achieved when water depth was less than 1 m and mats exceeded 20 m^2.

PART III: THE LAKE CONWAY SYSTEM

18. Lake Conway is a 743.0-ha urban lake located in South Orlando, Orange County, Florida (Figure 1). The lake consists of five interconnecting pools which include Lake Gatlin, Little Lake Conway (East and West Pool), and Lake Conway (Middle and South Pool). The lake system is mesotrophic with gradually increasing eutrophic conditions as one proceeds north through the five pools (Conley et al. 1979). The substratum is primarily sand, except in areas of thick vegetation near shore or in dredged canals where organic detritus or silt has accumulated. The bottom contours are rather steep when compared with most central Florida lakes. Greater than 50% of the total lake bottom is deeper than 6.0 m (Schardt et al. 1981).

19. During the baseline study period, Illinois pondweed (Potamogeton illinoensis) and eelgrass (Vallisneria americana) were the dominant shallow-water (<2.0 m) submergent macrophytes in most pools; stonewort (Nitella megacarpa) and hydrilla (Hydrilla verticillata) predominated in water from 2-6 m deep (Schardt et al. 1981). During the first and second poststocking years, most macrophyte species decreased in distribution and abundance. An exception was eelgrass, which is not a preferred food of the white amur (Schardt et al. 1981).

20. Most of the emergent vegetation on Lake Conway had been removed for beach development prior to the initiation of the LSOMT. This trend of habitat modification and destruction has been documented for the five years prior to our work (Williams et al. 1982) and continued during the study. However, a narrow fringe of maidencane (Panicum hemitomon), lake rush (Fuirena scirpoides), pickerelweed (Pontederia lanceolata), or cattail (primarily Typha latifolia) persisted in some areas.

21. Given below are brief descriptions of each permanent shoreline sampling site and a chronology of important changes in the habitat at these sites. Appendices A and B of this report summarize the vegetation and substratum characteristics of each permanent trapping station for all sites during the first and second poststocking periods, respectively. These appendices can be compared directly with baseline conditions (Appendix A of Godley et al. 1981).

22. The inclusion of primrose willow (Ludwigia peruviana) and arrowhead (Sagittaria lancifolia) in Appendix B but not in Appendix A of this report should not be interpreted as the sudden appearance of these plant species on the study sites during SY3. Rather, their appearances reflected changes in trap location as a result of fluctuations in water level. During SY3, high summer water level necessitated the placement of traps in previously drier habitats in which these two species occurred.

23. Hurricane David swept through the Orlando area on 4 September 1979 and uprooted the littoral zone vegetation at several sites. The effects of this natural disturbance are considered in Appendix B (second poststocking period) and not Appendix A because (1) this hurricane occurred with only 3.5 weeks remaining in the first poststocking period, and (2) the biannual sampling of the littoral zone vegetation and substratum conditions on the permanent sites was completed prior to the hurricane.

South Pool

24. The South Pool permanent shoreline site originally was 530 m in length (Figure 1) and included the only major section of undeveloped shoreline in the pool with large expanses of Panicum hemitomon, Fuirena scirpoides, and Pontederia lanceolata (Godley et al. 1981). Development of this site for housing occurred during the baseline study period and continued through both poststocking periods (Tables A1 and B1). During the baseline year, littoral zone vegetation was removed and the area converted to white sand beach between markers 240 and 310, at marker 350, and at markers 380 and 390 (Godley et al. 1981, paragraphs 5 and 35, Table A1). By the end of SY1, all upland vegetation from markers 240 to 300 and 350 to 460 had been removed. In the first poststocking period (SY2), drastic changes to the littoral zone vegetation occurred from markers 0 through 90, where all vegetation was removed and the habitat converted to white sand beaches (Table A1). In addition, all remaining upland and transitional zone habitats (except between markers 190-240 and 300-345) along the South Pool site were bulldozed in site preparation for houses. In SY3, shoreline development continued with the loss of all native vegetation from markers 140 through 230 and at 450 and 460 (Table B1). Thus,

by September 1980, the only remaining littoral zone vegetation on the South Pool site occurred in scattered patches between markers 100 and 130 and 320 and 440.

25. Although not quantified, several other changes in the littoral zone at this site were noted. Localized increases in water turbidity on the South Pool site were pronounced, especially following heavy rains. Higher turbidity levels probably resulted from the increased runoff from the newly developed shoreline. During the same period, a decrease in the vigor of the remaining beds of Panicum hemitomon, Pontederia lanceolata, and Fuirena scirpoides was observed even though these beds were not physically disturbed. This decrease in stem density and general condition probably also was related to the development of the adjacent shoreline. Immediately offshore from the South Pool site, several changes in the species composition of submergent plants were recorded. In several areas, especially between markers 150 and 340, large beds of Potamogeton illinoensis either were replaced by Vallisneria americana or showed no growth following the winter decline.

26. The South Pool area sampled with extended herp-patrol I was 840 m long and covered the shoreline from the Nela Avenue Bridge south to the north end of the South Pool permanent shoreline site (Figure 1). A 450-m section nearest the bridge bordered a deep hole (to 7 m depth) while most of the remaining 390 m was less than 2 m deep up to 50 m from shore. Illinois pondweed (Potamogeton illinoensis) was the only submerged macrophyte in the shallows of this extension. Pondweed was sparse in coverage except for the last 300 m where moderately dense beds existed. The only emergent vegetation along the entire length of this extension was several isolated patches of torpedo grass (Panicum repens); the remainder of the shoreline was white sand beach.

27. The extended herp-patrol II on South Pool stretched from the south end of the permanent site to the Detwilder outflow canal (Figure 1). This extension covered 1420 m of shoreline and had a uniformly shallow bottom with depths of less than 2 m extending 30 to 60 m offshore. Illinois pondweed was the dominant shallow-water submerged macrophyte along the entire length of this extension but grew with stonewart (Nitella megacarpa) in water depths of 1 to 2 m. Pondweed was more abundant on the South Pool extension II than on

extension I but noticeably declined in coverage during the study. An isolated patch of eelgrass (Vallisneria americana) occurred near shore between x-coordinates 380 and 390. All of the shoreline was white sand beach except for two small (<30 m) isolated patches of panic grass (Panicum hemitomon) and two patches (40 and 50 m in length) of cattail (Typha latifolia). This extension ended at the Detwilder outflow canal in an area known as 7-11 Cove. This cove (60x100 m) was unique in South Pool in that it contained the only quiet backwaters. The banks were lined with shrubs and bordered by several stands of Panicum hemitomon in the shallows. Patches of spatterdock (Nuphar luteum) and waterlily (Nymphaea odorata) grew in several areas of the cove. The bottom of 7-11 Cove was heavily silted with no submerged macrophytes; the water depth was less than 2 m.

28. The South Pool selective herp-patrol covered 2540 m of shoreline, extending around the remaining shoreline from 7-11 Cove north and west to the Nela Avenue bridge (Figure 1). The easternmost shore of South Pool from 7-11 Cove to coordinates 400, 180 had steep contours (to 4 m) with sparse beds of pondweed and stonewort offshore. Along the shore of this section were three Panicum hemitomon beds of 140, 110, and 60 m in length; the remainder was beach habitat. North and west of this section to a point near coordinates 275, 208 the habitat was relatively uniform: sand beaches with gradually sloping contours and sparse pondweed interspersed with stonewort in deeper areas. From a point near coordinates 275, 208 west to the Nela Avenue bridge the bottom contours were rather steep with sparse pondweed near shore and stonewort offshore. White sand beaches lined most of this shore except for a small (40 m) patch of cattail near the bridge.

29. In summary, the herpetofaunal habitat in South Pool underwent significant changes during the study. Most of the littoral zone of the permanent shoreline site was developed during SY1 and SY2. Offshore from this site the dense beds of pondweed were reduced in size and coverage by the white amur during SY2 and remained sparse and well cropped for the remainder of the study. By the time the two extended herp-patrols (August and November 1978) and the selective herp-patrol (November 1978) were established, shallow-water macrophyte abundance had declined noticeably in South Pool. General observations in these areas during SY1 suggested that pondweed in particular

was as common here as on the permanent site in that year. Schardt et al. (1981; Tables B1 and B16, Figure J9) documented a 98.9% reduction in Potamogeton illinoensis biomass and an 85.7% reduction in percent coverage from baseline conditions to SY3 for the entire South Pool.

Middle Pool

30. The Middle Pool permanent shoreline site (Figure 1) was 200 m in length and averaged 60 m in width. It was located at the northern end of a large cattail (Typha latifolia) marsh which had a dense, inner zone of herbaceous aquatics. The site was sampled with three transects: an inner herbaceous zone where traps were set (1000 series transect), and two herp-patrol transects (2000 series = center of cattails, 3000 series = outer edge of cattails). During April 1978 of the baseline study, all shoreline and upland vegetation between markers 1000 and 1120 was cleared with bulldozers and draglines (Godley et al. 1981) effectively removing all vegetation from trapping stations 1000 to 1120 and all cattail from markers 2000 to 2120. A 10-m-wide outer fringe of cattail (markers 3000-3120) and all marsh habitat to the west of the site (including 80 m of the 1000, 2000, and 3000 series transects) were left intact.

31. No additional development occurred on the Middle Pool site during the study. On the previously disturbed section where traps were set (markers 1000-1120), lake rush (Fuirena scirpoides) and a few cattail (Typha latifolia) gradually invaded the bare, sandy shoreline (Tables A2 and B2). However, the 10-m outer fringe of cattail between markers 3000 and 3060 showed no regrowth following the winter of 1978-79, possibly because of previous disturbance. Several small, low growing patches of Potamogeton illinoensis and Nitella sp. invaded the open water between markers 2000 and 2120 and 3000 and 3120 during the summer of 1979, and persisted through the remainder of the study.

32. On the undisturbed sections, waterhyacinth (Eichhornia crassipes) became the dominant plant at several trapping stations and replaced Pontederia lanceolata and Typha latifolia (Tables A2 and B2). No changes in vegetation were detected on the undisturbed sections of the 2000 (2120-2200) and 3000 (3121-3200) series transects in Middle Pool.

East Pool

33. The permanent sampling site in East Pool was located at the northwest end of an uninhabited island (Figure [illegible] This site initially was 200 m in length and consisted of a 10- to 15-m outer fringe of cattail (Typha latifolia) and an inner zone of herbaceous aquatics, especially waterhyacinth (Eichhornia crassipes). No habitat destruction occurred on the East Pool permanent shoreline site during the study. However, several changes in plant species dominance and substratum conditions in the poststocking periods were recorded (Table A3 and B3). Waterhyacinth (Eichhornia crassipes) invaded or increased in dominance at several trap stations with concomitant decreases in the abundances of Panicum hemitomon and Pontederia lanceolata. At the East Pool trapping stations, the mean depth of the detrital layer decreased from a mean coded value of 4.0[illegible] (= 1[illegible] cm) in the baseline period (see Table A4 of Godley et al. 1981) to 3.01 (= 8.0 cm) in the first poststocking period (Table A3, this report) to 2.15 (= [illegible].5 cm) in the second poststocking period (Table B3). The decreases in mean detrital depth apparently were caused by two factors: (1) compaction of the substratum along the trapline as a result of continued human foot traffic; and (2) declining water levels, which required that traps be set slightly farther from shore in more sandy habitats.

34. Funnel trap results from the baseline and first poststocking periods showed that (1) the East Pool island site had the highest trap success of any permanent site on Lake Conway, but that (2) capture success was declining on the sampled section of the island. A preliminary survey of the entire island in September 1979 indicated that major portions of the island were similar to the permanent site in plant species composition and substratum conditions. To determine if declining herpetofaunal populations on the permanent site were the result of repeated trapping and human disturbance or were characteristic of the entire island, the trapline on the island was extended from 1210 to 1300 in October 1979 and again in December 1979 to encompass the entire island (1010-1470). Vegetation and substratum conditions for the East Pool extension trap stations are provided in Table B3.

35. Immediately offshore from this site, no change from baseline

conditions was noticed in the abundance of Vallisneria americana, but the percent cover and density of Potamogeton illinoensis apparently decreased, probably as a result of the white amur feeding activities (Schardt et al. 1981). The only noticeable change in vegetation as a result of Hurricane David was the uprooting of some cattail (Typha latifolia) that fringed the littoral zone of this site.

West Pool

36. The West Pool site was 570 m in total length, included the only large, continuous section of emergent vegetation in the pool, and was bordered by beach habitat at each end. The littoral zone vegetation included a mixture of Panicum hemitomon, Pontederia lanceolata, Typha latifolia, and Eichhornia crassipes (Godley et al. 1981). Several changes in the habitat occurred at this site during the first poststocking period (Table A4). Trap stations 0 through 70, which previously were open sand and beach habitats with sparse vegetation, overgrew considerably with Fuirena scirpoides and Panicum repens. Waterhyacinth (Eichhornia crassipes) continued its expansion and was the dominant vegetation at 17 trap stations by the end of the first poststocking period. The waterhyacinth primarily replaced beds of Pontederia lanceolata but Panicum hemitomom also was reduced in coverage. Typha latifolia beds on the West Pool site also increased in size.

37. The effect of Hurricane David on the littoral zone vegetation was more severe in West Pool than at any other permanent sampling site. Many extensive beds of Pontederia lanceolata were uprooted and several waterhyacinth mats either were set afloat or displaced from their original position (Table B4).

38. Offshore from this site a reduction in the coverage of Potamogeton illinoensis was noted, presumably as the result of white amur feeding activities. The Vallisneria americana beds, which covered most of the bottom offshore, remained the same in distribution and coverage but showed a reduction in stem height through both poststocking periods.

39. The West Pool extended herp-patrol was initiated in November 1978 and covered the shoreline from the southwestern end of the permanent site to the

entrance of Gatlin Canal (Figure 1), a distance of about 1450 m. Along this shoreline, water depth generally was less than 2.0 m, and the bottom was sandy.

40. At the time this extension was initiated, several dense stands of shallow-water macrophytes existed. At coordinates 137, 403 a luxuriant bed (40 m by 100 m) of eelgrass (Vallisneria americana) mixed with pondweed (Potamogeton illinoensis) occurred. About 300 m to the north (144, 433) a particularly dense stand of pondweed also existed. Another dense stand of eelgrass was present from this area north to the entrance to Gatlin Canal. In the intervening shallow-water areas sampled by the extended herp-patrol, the bottom was either bare sand or sparsely vegetated by Potamogeton illinoensis. Offshore from this site, the bottom was bare or supported stonewort and hydrilla. Most of the shoreline was bare sandy beach but cattail (Typha latifolia) beds of 90 m and 60 m, respectively, existed at two sites (128, 415 and 147, 457) and small (less than 30 m), scattered beds of Panicum repens, or P. hemitomon, occurred in several other areas (156, [illegible]; 146, 427; 155, 445).

41. The most important change that occurred on the West Pool extension was the reduction or elimination of pondweed from most areas. Eelgrass was not eliminated but showed an apparent reduction in stem height in the two areas (noted above) where it was most abundant. No major changes occurred in the littoral zone of this site. Deepwater vegetation was not monitored by us but Schardt et al. (1981, Figure 3b) found a [illegible]1.5% reduction in total percent coverage in West Pool from August 1977 to August 198[illegible].

42. The West Pool selective herp-patrol was 1450 m in length and extended from near the East Pool entrance into West Pool south to the permanent shoreline site (Figure 1). By the time this herp-patrol was initiated (September 1979) most of the shallow-water macrophytes had been eliminated. Most of the bottom was bare sand with sparse Potamogeton illinoensis near shore and bare bottom or stonewort offshore. Most of the shoreline was beach habitat but two cattail beds (35 and 60 m at 236, 403 and 226, 395, respectively) and three stands of Panicum hemitomon (250, 60, and 40 m centered at 225, [illegible]; [illegible], 465; and 247, 415, respectively) were present. No major changes in littoral zone vegetation occurred along this site for the remainder of the study.

Gatlin Canal

43. The permanent shoreline site for Lake Gatlin extended the entire length of the canal (470 m) from Lake Gatlin to West Pool (Figure 1). During the baseline study period, funnel traps were set on both the west (0-40) and east (1050-1190) sides of Gatlin Canal (Godley et al. 1981). One homeowner on the east side of Gatlin Canal objected to traps being placed along his shoreline. As a result, all trap stations were relocated to the west side beginning in February 1979. Because few changes in vegetational composition and substratum occurred at the sites on the east shoreline from October to February in SY2, data for the east side can be found in Godley et al. (1981; Table A5). A summary of the plant species and substratum types for the west shoreline only is presented in Table A5 of this report.

44. In addition to modifying the location of the trapping stations, several other changes occurred in Gatlin Canal during the first poststocking period. Cabomba caroliniana, which initially was restricted to the west offshoot canal between markers 1120 and 1150, spread to occupy most of the open water in the canal along its entire length. However, constant motorboat traffic kept the center of Gatlin Canal relatively free of vegetation. The Typha latifolia bed located between markers 260 and 290 was sprayed with herbicide in July 1979 and showed no regrowth until the following spring. Also, waterhyacinth (Eichhornia crassipes) became established in the Nuphar luteum bed between markers 10 and 40 during the first poststocking period.

45. Several important events occurred in Gatlin Canal during the second poststocking period. On 6 May 1980 heavy rains washed out large mats of waterhyacinth from the western off-shoot canal near the bridge (Figure 1) into Gatlin Canal. These hyacinths were sprayed with herbicide in June 1980 and sank within six weeks. Early in September, heavy rains again washed hyacinths from this canal into Gatlin Canal completely blocking boat traffic. Herp-patrols beyond marker 70 were discontinued in the last month of the study.

PART IV: THE HERPETOFAUNA OF LAKE CONWAY

46. Beginning in June 1977 and continuing through September 1980 a total of 11,[illegible] individuals of 12 species of amphibians and 17 species of reptiles was recorded on Lake Conway. All 29 species were taken in the lake or along its shore and are dependent in some way (e.g., aquatic or semiaquatic as adults, terrestrial as adults with aquatic larval stages, feed on aquatic or semiaquatic species, etc.) on the lake environment. During the 15-month baseline study (Godley et al. 1981), [illegible] individuals representing 11 species of amphibians and 16 species of reptiles were recorded. From October 1978 through September 1979 (CY[illegible]), an additional [illegible] individuals and two additional species were added to the study. One specimen of the dwarf siren, Pseudobranchus striatus, was collected in East Pool and two specimens of the introduced red-eared turtle, Pseudemys scripta, were taken in South Pool. No additional species were among the 2,[illegible] individuals taken in CY[illegible].

4[illegible]. Prior to initiation of the fieldwork we projected that the herpetofauna of Lake Conway might include [illegible] species. As we became familiar with the lake system and its shoreline habitats, it soon became obvious that several species of frogs that commonly breed in temporary ponds in central Florida did not occur on the lake. Notable among these was Bufo quercicus, Hyla gratiosa, Limnaoedus ocularis, Pseudacris nigrita, and Scaphiopus holbrooki. Two species of snakes, Nerodia taxispilota and Agkistrodon piscivorus, often found in and around cypress swamps and other permanent bodies of water were absent, probably because of the lack of suitable riverine forest or swamp habitat. Three other aquatic species, the peninsula newt (Notophthalmus viridescens), the bullfrog (Rana catesbeiana), and the black swamp snake (Seminatrix pygaea) were expected but to date have not been recorded. In our experience, the peninsula newt, when present, is common. The bullfrog is easily recognized by its large size and distinctive call. We are unable to explain the absence of these two species. We suspect the presence of Seminatrix pygaea in the lake system but, because of the marginal nature of the habitat, it probably is rare and as yet undetected. In this respect, two other species (Pseudobranchus striatus and Regina alleni) that are rare in Lake

Conway are relatively common in habitats frequented by the black swamp snake, S. pygaea. Coluber constrictor, a terrestrial snake, was recorded twice in South Pool, once in a drift fence trap in water and once on a shoreline census. An introduced species, the red-eared turtle (Pseudemys scripta) was taken on three occasions in South Pool. Originally we considered these three individuals to represent escaped or released pets but subsequently we established that a breeding population occurs in Lake Conway and thus included the species in the fauna. Based on the three years of sampling, the herpetofauna of Lake Conway includes four species of salamanders, eight anurans, one crocodilian, nine turtles, and seven snakes (Table 1).

48. The cumulative number of species is plotted against the cummulative number of individuals for each of the five pools and for the total lake system in Figure 2. In each graph, the circle represents the last individual recorded for that pool. Approximately 90% of the species known from the Lake Conway herpetofauna had been recorded with the first 2400 (24%) specimens sampled and this occurred in the first nine months of the three-year study. South Pool had the highest number of species (23 species) followed by Middle, East, and Gatlin (20) and West (17). The fastest rate of species accumulation as a function of the number of individuals sampled was that of South Pool, followed closely by West, Middle, East, and Gatlin. Because the total samples from each pool are unequal and the result of differential sampling effort, we compared the species accumulations for the first 1863 individuals recorded from each pool. This value was equal to the smallest available sample, that from Lake Gatlin. The first 1863 individuals from the total sample recorded 22 species. In this comparison, South Pool had the highest species diversity (22 species) followed by Middle and Gatlin (20), East (18), and West (17). The number of species recorded for Middle and West Pools using the first 1863 individuals was equal to the total recorded diversity. Using this initial sample, the species diversity in South Pool was 95.6% of the known diversity at the end of year three and that in East Pool was 90.0%. However, with a sample of four more individuals (N=1867), the 19th species (95.0% of the known fauna) was added to East Pool (Figure 2). The first 10% of the total individuals observed in each pool gave a high of [illegible] of the recorded species in South Pool, followed by [illegible] for West Pool, [illegible] for Middle Pool, 60% for East Pool, and a low of 45% of the

recorded species in Lake Gatlin. More than 80% of the species in each pool had been sampled when half the total individuals from that pool had been recorded. This high percent was obtained with between 952 captures (Gatlin) and [illegible] captures (South). Although sampling effort for the total fauna varied between pools, the species curves are generally similar and convince us that we have adequately sampled the amphibian and reptile fauna of each pool in the Lake Conway system.

44. Sternotherus odoratus, the most common species encountered during our study, made up 29.5% of the total sample. The next most abundant species were Hyla cinerea (22.0%), Acris gryllus (11.4%), Pseudemys floridana (7.5%), and Rana utricularia (4.1%). The other 24 species were uncommon, each representing less than 4.5% of the total sample. The most common salamander on Lake Conway was Amphiuma means (N=281), followed closely by Siren lacertina (238). Adults of the frogs Hyla cinerea and Acris gryllus were recorded 5.4 and 2.8 times more frequently than the next most commonly observed frog species, Rana utricularia (N=491), which was slightly more abundant than Bufo terrestris ([illegible]). Alligators were not abundant on Lake Conway, but because of their size and easy detection they accounted for 285 observations during the three-year study. Among turtles, Sternotherus odoratus was nearly four times more frequently recorded than Pseudemys floridana (N=901) which was recorded four times more often than Pseudemys nelsoni (226), the next most frequently recorded species of turtle. Nerodia cyclopion was the most common snake (N=[illegible]) on the lake and accounted for 77.2% of the total observations for snakes.

[illegible]. The frequency distribution of species by sampling method for the three-year study is presented in Table A1 of Bancroft et al. (1983). Specimens collected on the extended and selective herp-patrols during CY3 are included with the regular herp-patrol data, as are specimens taken for reproductive and stomach analyses. Specimens taken in gill nets, by muddling, or while radiotracking are included in "other methods." In this and all subsequent table citations, data for the different life stages (eggs, larvae, adults), when available, are treated separately. Herp-patrol was the most successful sampling technique and accounted for 10,346 (86.7%) of the individuals sampled and 25 (79.5%) of the species. Funnel traps took 781

(6.5%) of the individuals and 20 ([illegible]) of the species. Shoreline censuses recorded 24 (79.3%) of the species with only 245 (2.0%) of the individuals. Shoreline censuses were very effective in determining the species present in each pool but did not contribute substantially to the quantitative data. The other sampling methods each took nine or fewer species and less than [illegible] of the individuals.

51. Of 29 species observed during the study, five were recorded only with one sampling technique: all were relatively rare species (Table A1, Bancroft et al. 1983). The salamander Eurycea quadridigitata and the snake Thamnophis sirtalis were sampled only during the shoreline censuses and the frogs Hyla femoralis and H. squirella and the turtle Deirochelys reticularia were recorded only on herp-patrols. All other species were sampled with at least two methods. Herp-patrol, the most productive sampling method, accounted for very high percentages of the observations of adult frogs and sizable percentages of Siren lacertina (34%), all species of turtles, and the two species of water snakes, Nerodia fasciata (59%) and N. cyclopion ([illegible]). Funnel trapping resulted in a high percentage of our observations of Amphiuma means (92%), and sizable percentages of the records of the salamanders Siren lacertina (47%), the turtles Chelydra serpentina (57%), Kinosternon baurii (29%), and K. subrubrum (33%), the more common snake Nerodia cyclopion (33%) and the rarer Regina alleni (57%) and Farancia abacura (33%), and most frog larvae.

52. Any methodological comparisons derived from Table A1 of Bancroft et al. (1983) clearly indicate the diversity of species of amphibians and reptiles in Lake Conway and point to the importance of a multifaceted sampling program for a study of this magnitude. Comparisons of the relative abundance of species by sampling method also indicate the differential susceptibility of some species to different techniques. For example, vocalizing frogs make detection from a distance very easy as compared to most turtles that must be located visually from a distance of a metre or two. Also, species that are susceptible to trapping or have food (bait) preferences are more easily sampled than large individuals with different food habits (e.g., larvae versus adult Rana utricularia; small, carnivorous versus large, herbivorous turtles). In addition, the susceptibility of a species to capture by a specific method is confounded by its absolute abundance and the sampling effort devoted to a

method, i.e., rarer species are likely to be represented by only a single, commonly employed method. Thus, the biological attributes of a species and the effort put into a sampling technique introduced a certain bias in the data and made cross-method comparisons difficult and less informative.

Species Distribution and Abundance

53. The distributions of amphibians and reptiles observed or captured from the five pools of the Lake Conway system are summarized for the three years in Table A2 of Bancroft et al. (1983). This summary includes the total number of individuals recorded by all sampling methods on the permanent sites and throughout each pool. Because sampling effort and catch varied between pools and between years, the data presented in the table provide only an estimate of the species diversity in each pool and the species distributions among pools.

54. The surface area of each pool and its shoreline together with the number of species and number of individuals recorded during the study are summarized in Table 2. Gatlin Canal is included with Lake Gatlin in this comparison. As expected, the highest diversity (23 species) was recorded from South Pool where the largest sample (3364 individuals) was taken. The lowest diversity was in West Pool (17 species) with an intermediate sample of 2146 individuals. Lake Gatlin had the smallest sample (1563 individuals) but with a species diversity (20 species) equivalent to those of Middle and East Pools. A comparison of species diversity to surface area of each pool did not follow the expected; that is, the largest pool did not have the highest diversity and smallest did not have the lowest. The higher than expected diversity in East Pool may be, in part, the result of its more extensive shoreline. East Pool with 42.7% of the surface area but 91.1% of the shoreline of Middle Pool has the same number of species (20). In some instances (e.g., South Pool) the higher diversity is a reflection of greater effort and the presence of a few rare species (e.g., *Hyla squirella*, *Pseudemys scripta*, *Coluber constrictor*, and *Thamnophis sirtalis*). In other instances (e.g., West Pool) the low recorded diversity appears to be a true reflection of the herpetofauna in the pool and is not as easily explained as are the values found for other pools. Nearly 50%

of the total West Pool sample consisted of adult *Hyla cinerea* (1064 individuals), a sample much larger than values recorded for any other pool (Table A2, Bancroft et al. 1983). In contrast, the numbers of individual captures for the two native species of *Pseudemys* were considerably below those for these two species in the other four pools. Thus, the low diversity recorded for West Pool apparently is reflective of the West Pool environment. In certain instances (e.g., West Pool), the recorded differences accurately reflect the pool's species composition (species unevenness) but, in others (Middle Pool and Lake Gatlin), the differences are clearly the result of inadequately sampling some of the rarer species. These differences will be treated in more depth in the permanent site data presented below, and in the individual species accounts in a separate report.

55. The known occurrence of species of amphibians and reptiles in Lake Conway varied among pools (Table A2, Bancroft et al. 1983). Of the 29 species recorded from the lake system, 14 (48%) are known from all pools. These 14 included the most common species in the lake and accounted for 96.26% of all records. A few of these 14 species (*Kinosternon subrubrum*, *Trionyx ferox*, and *Nerodia fasciata*) were relatively rare in the lake and each represented less than 1% of the total sample. Of the 15 remaining species with distributions in one to four pools, none represents more than 2.5% of the total capture. The most common of these 15 species was *Rana grylio* (1.96% adults and 0.49% larvae) which was absent from South Pool. We suspect that it may occur in South Pool transiently but it has not been seen or heard there during the three-year study. Judging from the habitats occupied in other pools, we attribute the apparent absence of *R. grylio* in South Pool to a lack of suitable habitat and to the drastic reduction and loss to shoreline development during the study of nearly all natural habitat, marginal as it was for *R. grylio*. We suspect that some of the rarer species (e.g., *Pseudobranchus striatus*, *Kinosternon baurii*, *Deirochelys reticularia*, *Farancia abacura*, *Regina alleni*) have wider distributions among pools than our data indicate and that additional sampling effort would support this view. In fact, some of these have been collected in the fourth year from pools in which they were unknown through the three-year study. Other rare species (including *Eurycea quadridigitata* and *Hyla squirella*) probably occurred in suitable habitat throughout the lake but have

been eliminated because of the extensive habitat modification and loss.

Permanent Shoreline Sites

56. The distributions and total numbers of individuals of amphibians and reptiles recorded from the permanent sites in each pool are presented in Tables 2 of this report and A3 of Bancroft et al. (1983). A total of 7754 observations (65.0% of the total sample) was made on these five sites during the three-year study. The bulk of the quantitative data (86.34%) from these permanent sites was obtained with herp-patrols. Funnel trapping added 9.03% and shoreline census another 2.41%. The other five sampling techniques added between 0.86% (drift fence) and 0.04% (alligator census) to the total sample.

57. The permanent sites covered 1770 m of shoreline in Lake Conway (Table 2). The linear distance sampled and time spent on herp-patrols and with funnel traps varied among pools (Table 2). Of the 29 species of amphibians and reptiles known from Lake Conway, 28 were recorded on the permanent sites. Only the treefrog Hyla femoralis was not taken on a permanent site. One salamander (Eurycea quadridigitata), one frog (Hyla squirella), one turtle (Deirochelys reticularia), and four snakes (Coluber constrictor, Regina alleni, Thamnophis sauritus, and Thamnophis sirtalis) were recorded only from permanent sites. In addition, more than 90% of the samples of the salamander Amphiuma means, the frogs Acris gryllus, Gastrophryne carolinensis, Hyla cinerea, Rana grylio, and Rana utricularia, and the turtles Chelydra serpentina and Kinosternon baurii were taken on the permanent sites.

58. The mean relative densities of each species on the five permanent shoreline sites as determined by the two major sampling methods are shown for funnel traps (mean numbr/100 trap days) in Table A4 of Bancroft et al. (1983), and for herp-patrol (mean number/hr) in Table A5 of Bancroft et al. (1983). Between-pool differences in the relative abundance of a species were determined by using the chi-square approximation of the nonparametric Kruskal-Wallis extension of the Mann-Whitney U-test (Barr et al. 1979) for herp-patrol trips, and the difference among proportions chi-square test (Freund 1973) for funnel trapping. The mean tested on herp-patrols was the mean number of individuals of a species observed per hour for all trips with run numbers (see paragraph

11) on each permanent site. The proportion tested was the total number of a species captured at a site divided by the total number of trap days at that site during each year of study. If significant ($P < 0.05$) between-pool differences were found, pair-wise comparisons of pools were made using the Mann-Whitney U-test (herp-patrols) or the difference among proportions test (funnel traps). Because the same data were analyzed for this second test, the alpha level of significance was increased to $P < 0.025$. In general, the sum ranks test used for herp-patrol comparisons is less robust than the chi-square test used for funnel trap analysis. This means that trends seen in a number of species on herp-patrols probably are real, but more difficult to demonstrate statistically than trends observed in funnel-trapped species.

59. The total mean relative densities (mean number/hr) of seven species recorded from the permanent sites on herp-patrols varied significantly among pools during the three-year study (Table A5, Bancroft et al. 1983). Adult frogs of the species Acris gryllus, Hyla cinerea, Rana grylio, and Rana utricularia varied significantly among pools. Of these four, only Acris gryllus had significantly different means during each study year and for the combined years. The other three species (Pseudemys floridana, Pseudemys nelsoni, and Sternotherus odoratus) each had a significant difference for one year and a total mean difference but no significant differences for all three years. Because seasonality is an important component of frog reproduction and reproductive activity varied among species, we will consider the frog data separately. The turtles Sternotherus odoratus and Pseudemys floridana showed significant between-pool differences in mean relative densities for each year as well as for the total combined values. Pseudemys nelsoni had significant between-pool differences in SY1, SY2, and total but not in SY3. The small sample (19 individuals) of P. nelsoni from the permanent sites in SY3 was not adequate to demonstrate statistically any between-pool differences although between-pool trends in SY3 generally followed those established in SY1 and SY2 (Table A5, Bancroft et al. 1983). Only Siren lacertina of the remaining 12 species recorded on herp-patrols from the permanent sites showed a significant between-pool difference and that was recorded in SY3 in East Pool.

60. Eight species of amphibians and reptiles captured in funnel traps had significant differences in total mean relative densities among pools (Table A4,

Bancroft et al. 1983). Three of these eight species (Amphiuma means, Rana grylio adults and larvae, and Sternotherus odoratus) showed significant differences among pools in all three years. The salamander Siren lacertina and larvae of the frog Rana utricularia showed significant between-pool differences in all years except SY3 and the snake Nerodia cyclopion showed significant differences in all years except SY2. Hyla cinerea larvae and Kinosternon subrubrum had significant between-pool differences in SY1 but not in SY2 or SY3. The high SY1 values contributed to the totals which were significant for both species. Only the turtle Chelydra serpentina had a significant between-pool difference in one year (SY2) but no total difference. The fact that no specimens were taken in Gatlin Canal in SY3 and the overall small sample sizes affected the comparisons for C. serpentina.

61. The relative densities of the two salamanders as recorded with funnel traps decreased on the permanent sites through the three-year study (Table A4, Bancroft et al. 1983). Siren lacertina densities declined in Middle and East Pools and to a lesser extent in West Pool and Gatlin Canal and those of Amphiuma means declined in all pools but most noticeably in East Pool where relative density went from 30.41 in SY1 to 1.43 in SY3. Declines in A. means densities to apparent extirpation on the permanent sites in South and Middle Pools corresponded with the massive habitat destruction that occurred there in SY1 and SY2 (Table A1, Godley et al. 1981; Appendix A, Tables A1 and A2, this report). For both species of salamander, East Pool had the highest densities and South Pool the lowest. Densities in Gatlin Canal were low but showed the least fluctuations among years.

62. Interestingly, the funnel traps proved effective in sampling the relative density of larvae of three of the eight species of frogs recorded from the lake system. All of the Hyla cinerea larvae were taken in three pools during SY1 when water levels for the lake were high. Both species of Rana call from and deposit their eggs in the littoral zone usually over deeper water than the other frog species. Their tadpoles are larger and spend more time in deeper water than those of Acris gryllus, Bufo terrestris, and Gastrophryne carolinensis which are found primarily in very shallow water (<10 cm). Because little is known about movements of anuran larvae, we assume that local densities reflect the reproductive success of frogs at the same site. Habitat

disruption and seasonality as it affects frog breeding will influence larval densities. Little can be said about between-pool comparisons for frogs taken in funnel traps except that *Rana utricularia* larvae were considerably more abundant in SY2 in all pools than in either of the other years.

63. Funnel traps contributed 60.0% of all captures on the permanent sites of the turtles *Chelydra serpentina*, 52.6% of those for *Kinosternon subrubrum*, but only 2.3% of those for *Sternotherus odoratus*. Yet *S. odoratus* was the only species in the funnel trap data that showed significant mean density differences among pools in all years. The relatively frequent captures in Gatlin Canal in SY2 resulted in the significant between-pool differences for *C. serpentina* in that year (Table A4, Bancroft et al. 1983). A similar pattern existed for *Kinosternon subrubrum* in South Pool in SY1. The decline in *K. subrubrum* on the permanent sites in South Pool was the result of habitat disruption. Although no specimens were trapped in South Pool in SY3, individuals were recorded on herp-patrols (Table A5, Bancroft et al. 1983) but at lower relative densities.

64. The snake *Nerodia cyclopion* declined on all permanent sites and most strikingly on South, Middle, and East Pools. We attribute the decline in South and Middle Pools in part to high mortality during shoreline development. We suspect the reduction in East Pool may have resulted from high predation by river otter (*Lutra canadensis*) in SY1 and SY2.

65. The mean relative densities of calling males of the more common of species of frogs recorded from the permanent sites are compared in Table A6, Bancroft et al. (1983). Only data from the breeding seasons are compared. In contrast to most other species of amphibian and reptile samples from the permanent sites, densities of most frogs increased through the three years. Significant differences among pools were recorded in all three years and for total years only for *Acris gryllus*. Three other species with mean differences among pools for total years and one or two study years included *Gastrophryne carolinensis* in SY2, and *Hyla cinerea* and *Rana grylio* in SY1 and SY3. While we are unable to account completely for the increase in density of calling male frogs on our permanent sites, several explanations exist. The increase may represent a high in normal fluctuations of density that are correlated with weather conditions highly favorable to breeding during the study. Another

possibility is that the increase may represent an increase in survivorship as the number of predators, especially snakes that feed on adult frogs, decreased. Also, larval survivorship and growth may have increased as a secondary effect of the shifts in vegetation.

66. Included below are detailed community analyses of the five permanent shoreline sites on Lake Conway. For each site a "point analysis" and a "trip analysis" are presented. Point analyses show the numerical distributions of amphibians and reptiles observed or captured along 10-m increments of the shoreline sites during each study year. Trip analyses show the numerical distributions of species through time on the bimonthly sampling trips to Lake Conway. The species codes used in all point and trip analyses figures are listed in Table 1.

67. At least nine figures (one for funnel trapping [total captures] and two for herp-patrols [anurans only, and salamanders and reptiles only] in each of three years) are presented for the point and for the trip analyses of each site. Each funnel trap trip analysis figure includes the total number of funnel traps set at a site (per trip or per trap station) and, for herp-patrols, the total time (minutes) spent on each herp-patrol trip at a site. Thus, each figure is scaled by sampling effort. In some cases the total number of individuals recorded on the point analysis for a site will be less than the number of individuals recorded on the trip analysis for that site; this means that some individuals on a trip were not given a sample point and thus do not appear on the point analysis.

68. Between-year comparisons of the relative abundances of species as determined by herp-patrol and funnel trapping for each permanent shoreline site on Lake Conway were summarized and significant between-year differences (not in Tables A4-A6, Bancroft et al. 1983) have been incorporated into the text of this report.

South Pool

69. The permanent shoreline site in South Pool had the highest recorded diversity (22 species) of any site but also received the most effort (Tables A4 and A6, Bancroft et al. 1983). Alligator mississippiensis was the only species known from South Pool that was not recorded on the permanent site. Four species taken from the South Pool sites are unknown elsewhere on Lake

Conway and include _Hyla squirella_, _Pseudemys scripta_, _Coluber constrictor_, and _Thamnophis sirtalis_. The relative density of _Kinosternon subrubrum_ was significantly greater (78.9% of the total sample from all permanent sites) on the South Pool site than on any other permanent site in Lake Conway (Table A3, Bancroft et al. 1983). High densities for _Acris gryllus_ adults (62.1% of the total sample from all permanent sites) and _Nerodia cyclopion_ (51.8%) also were recorded on the South Pool permanent site. The highest total number of observations for four other species was recorded from the South Pool site and included the turtles _Kinosternon baurii_, _Sternotherus odoratus_, and _Trionyx ferox_ and the snake _Farancia abacura_. Thus, many components of the Lake Conway community of amphibians and reptiles are known best from South Pool. A conspicuous absence from the South Pool site is the frog _Rana grylio_. Interestingly, relative densities of _Rana utricularia_ also are lower on the South Pool sites than on the Middle, West, and Gatlin permanent sites.

70. Unfortunately, the shoreline of the South Pool permanent site was developed gradually for houses during the three-year study until nearly all the littoral vegetation was removed or the habitat strongly modified. At the beginning of the study (July 1977), 460 m of the 530 m permanent site was a continuous, undeveloped section of shoreline habitat (Godley et al. 1981). The northern 70 m of the site was a sandy, developed beach. By the end of SY1, 78% of the upland and transitional zone habitat bordering the permanent site had been cleared of understory vegetation to the waterline and about 25% of the emergent littoral zone vegetation was removed. In SY2 most of the remaining upland habitat was cleared and an additional 25% of the emergent littoral zone vegetation was eliminated. The same trend continued through SY3 so that less than 20% of the upland and shoreline habitat and only 30% of the original littoral zone habitat remained on the permanent site. The impact of this habitat modification and loss had a profound effect on several species in South Pool, notably _Amphiuma means_, _Kinosternon subrubrum_, and, especially, _Nerodia cyclopion_. Densities of _Nerodia cyclopion_ decreased 97% (from 101 records in SY1 to 4 records in SY2 and 3 records in SY3). Details of this change are presented in Bancroft et al. (1983).

71. The number of species sampled each year in South Pool and on the permanent site decreased between SY2 and SY3 (Table 3). In order to evaluate

this apparent decrease in diversity, the individual samples from SY2 and SY3 were compared to the cumulative plots of number of species and number of individuals collected in SY1 (Table 3 and Figure 2). We assumed that the curves for SY1 were representative of baseline conditions and that the permanent sites adequately represented the pools. The number of species based on sample sizes from SY2 and SY3 were read from the curve for SY1 and used as the expected species diversity for the sample. This expected value was compared to the actual species number recorded in SY2 and SY3 (Table 3). For the total of South Pool, the SY2 sample of 1019 individuals of 21 species was the same number as predicted if the sample had been taken in SY1. However, the SY3 sample size predicted 21 species but only 17 were taken. For the permanent site a similar pattern occurred. The SY1 sample of 1221 would have resulted in 21 species for the total pool plot (Figure 2) but only recorded 20. The much smaller SY2 sample predicted only 18 species but 20 were recorded. By SY3, the expected diversity should have held at 18 but only 14 species were recorded. Thus, a reduction in diversity of four species was noted in the South Pool and on the permanent sites for SY3.

72. Point analysis. The distributions of all amphibians and reptiles captured in funnel traps along the South Pool permanent shoreline site for each year are shown in Figures 3, 4, and 5. Most (91.8%) of the 56 captures in South Pool in SY1 were concentrated between markers 0 and 100 and between markers 360 and 460 where 47.9% of the traps were set. In general, these two productive areas at each end of the transect were characterized by a diverse, emergent littoral zone flora and mud substratum, while the depauperate, central area was dominated by *Fuirena scirpoides* and *Panicum hemitomon* and had a sand substratum (Godley et al. 1981, Table A1).

73. Even though trapping effort increased (Table A4, Bancroft et al. 1983) in SY2, only 17 captures were recorded. Three of these captures were of relatively rare species including the snakes *Farancia abacura* and *Regina alleni* and the turtle *Pseudemys scripta*. Larvae of *Rana utricularia* were taken at four sites and three *Sternotherus odoratus* were trapped at marker 0. *Siren lacertina* occurred at markers 10, 150, and 440. The major concentrations of the fauna recorded during SY1 (Figure 3) at each end of the site was not evident in SY2 (Figure 4). Most of this faunal reduction was attributed to the

loss of upland and transitional habitat in late SY1 and SY2 and the removal of emergent littoral zone vegetation between markers [illegible] and [illegible] in SY2. Most of the reduction at the ends of the site was due to the disappearance of individuals of Amphiuma means, Kinosternon subrubrum, and Nerodia cyclopion (Figures [illegible] and 4).

74. Trapping effort [illegible] increased to [illegible] trap days (Table A4, Bancroft et al. 198[illegible]) in SY[illegible], yet [illegible] was made. A single specimen of the snake Nerodia cyclopion was [illegible] marker [illegible] (Figure [illegible]). Interestingly, the upland and transitional [illegible] immediate area was still intact and some [illegible] (Appendix B, Table B[illegible]).

75. Comparisons among years [illegible] resulted in significant differences for four species [illegible] determined by funnel trapping. The salamander Amphiuma means [illegible], the turtles Kinosternon subrubrum (χ^2 = 66.[illegible]) and Sternotherus [illegible] ([illegible]), and the snake Nerodia cyclopion (χ^2 = [illegible].[illegible]4) [illegible] differences among years. In all four species the mean relative densities were higher in SY[illegible] than in the other two years; no differences between [illegible] and SY[illegible] were detected.

76. The spatial distribution of reptiles and salamanders observed or collected on herp-patrols for the three years (Figures [illegible]) [illegible] the same section of shoreline was similar to that observed for the [illegible]-trapped animals. These comparisons [illegible] to the area between markers [illegible] and 46[illegible]; traps were not set between markers 4[illegible] and [illegible] and observations from this section are not comparable. Most observations ([illegible].4%) of reptiles on herp-patrols between markers [illegible] and 46[illegible] in SY1 were located between markers [illegible] and 100 and [illegible]0 and 46[illegible]. In SY2 ([illegible]1.8%) and SY3 ([illegible]) similar trends were observed.

77. Much of the high densities recorded at the ends of the transect was the result of turtles. In SY1, 90.5% of the sample in these areas was made up of turtles of five species; in SY2 the values were [illegible]% and four species and in SY3 they were 100% and four species. One possible explanation for the greater observed densities at each end is that we spent more time and covered a greater area with the turnarounds at each end of our transect than at other stations. Examination of distributions at the ends of transects in other pools does not support this interpretation. These high concentrations, especially of

Sternotherus odoratus and Pseudemys floridana, at each end of the transect may be the result of offshore habitat preferences rather than a preference for the littoral zone with its emergent vegetation. At the ends of the transect broad areas of shallow water (<1.5 m) extended out some distance from shore and most turtles were captured in these shallower areas (Figures 6, 7, and 8). Along the central section of the South Pool site, deep water (>2 m) occurred immediately offshore from the edge of the emergent vegetation and turtle observations were fewer. The area from marker 460 to 530 had the greatest concentration of turtles on the site (Figures 6-8) with 34.7% of the total sample recorded in SY1, 41.[illegible]% in SY2, and 35.[illegible]% in SY3. Importantly, this section of developed shoreline had extensive, heavily vegetated (Potamogeton illinoensis) shallows but no emergent vegetation. We conclude that these high turtle densities are a reflection of offshore habitat preferences.

28. Some trends are obvious in comparing the distribution of species along the permanent site through the three years (Figures 6, 7, and 8). More gaps in the local distribution of species are obvious in SY2 and SY3 than in SY1. Seven species are represented in SY1, five in SY2, and only four in SY3. Individuals of Sternotherus odoratus were recorded at [illegible].7% of the total points on the site and 9[illegible].4% of the points with animals in SY1, on [illegible]4.8% of the total site and 94.6% of the site with animals in SY2, and on 64.8% of the total site and 100% of the sites with animals in SY3. The relative abundances of most species decreased during the three years but that of Sternotherus odoratus did not: S. odoratus made up [illegible].2% of the herp-patrol observations of reptiles and salamanders in SY1, 87.2% of the observations in SY2, and 9[illegible].2% of the observations in SY3. This suggests that even though the absolute density of stinkpots decreased through the study, S. odoratus responded differently than most other species.

29. Only a single species recorded on herp-patrols showed a significant decrease among years. The turtle Pseudemys floridana had highly significant (χ^2 = 2[illegible].5[illegible]) differences among years with the mean relative density in SY1 higher than that in SY2 and SY3, which were not significantly different from each other. During SY1, 57.5% of the herp-patrol sample of P. floridana (N=87) was recorded between markers 0 and 100 and 26.4% between markers 4[illegible]0 and 5[illegible]0. Three of the seven turtles taken in SY2 and the entire sample (N=3) in SY3 were

from the same area. We associate this dramatic reduction in relative density to the equally dramatic reduction of vegetation at the ends of the transect. At the beginning of the study (August 1977) extensive beds of Potamogeton illinoensis covered the bottom along the site but especially in the shallower northern areas. Hydrilla verticillata was common along the southern section of the site. By August 1980, P. illinoensis and H. verticillata had been eliminated from the site by grazing white amur (Schardt et al. 1981, Figures J1 and J4). Although sample sizes were much smaller, a similar pattern of decline existed for the other large, herbivorous turtle (Pseudemys nelsoni) on the site.

80. The distribution of calling frogs on the South Pool site is given in Figures 9, 10, and 11. The cricket frog, Acris gryllus, was the most common frog on the site (Tables A[illegible] and A[illegible], Bancroft et al. 198[illegible]). During SY1 males of A. gryllus were recorded calling along most of the permanent site except from the area between markers 480 and 530 which was a beach (Figure 9). The same pattern existed in SY2 (Figure 10) but by SY3 (Figure 11), the impact of habitat disruption and shoreline development was obvious on the dispersion of calling males. In SY1 and SY2, A. gryllus called from [illegible].8% and 75.9% of the points on the transect. In SY3, males were recorded from only 42.[illegible]% of the points. Noticeable absences in areas where males were common in previous years occurred between markers 0 and 100, an area developed in April and May of [illegible] (Appendix A, Table A1) and between markers 140 and 200, which was developed in May of [illegible] (Appendix B, Table B1). Other species were more patchily dispersed and relatively uncommon on the South Pool site. Even so, Hyla cinerea was often recorded in areas where Eichhornia crassipes was the dominant plant and Rana utricularia often occured in areas where Typha latifolia occurred (Appendices A, Table A1, and B, Table B1).

81. Trip analysis. The temporal distribution of amphibians and reptiles collected in funnel traps on the South Pool permanent shoreline site is shown in Figure 12. Trap success decreased with time even though the number of traps increased within SY1 and among years. The highest success rate occurred early in the study, between 21 July and 24 September 1977, when traps were set only between markers 0 and 120 (Godley et al. 1981). These traps accounted for 34 (66.6%) of 51 total captures from this section of shoreline during SY1. When

the trapline was expanded on 21 March 197[illegible] to include the entire 4[illegible]-m transect, most specimens were taken between markers 0 and 120 and between markers [illegible] and 4[illegible], although the capture rate for the section between [illegible] and [illegible] was lower than originally found. Because sample sizes in SY2 and SY[illegible] were small, clear seasonal patterns in funnel-trapped animals were not obvious. In general, more animals were trapped in the summer months (June through September) than at other times of the year. Activity patterns of single species are difficult to evaluate for this site alone because of the relatively low trapping success achieved, especially in SY[illegible] and SY[illegible]. Some species patterns may become more obvious when data are combined for all sampling techniques and across all pools; these are discussed in a separate report (Bancroft et al. 198[illegible]). Suggestive patterns of activity were found for Nerodia cyclopion which was absent in traps from November through mid-March. During this time, individuals were observed leaving the permanent sites and moving into upland overwintering sites. Site preparation of upland habitat for housing during the winter months effectively decimated the South Pool population of Nerodia cyclopion. Amphiuma means and Kinosternon subrubrum seemed to be active throughout the year.

82. The temporal distributions of salamanders and reptiles on South Pool herp-patrol trips are given in Figure 1[illegible]. Most individuals were observed during the months of July through November of the first year and decreased in abundance thereafter. A general pattern of observational peaks in activity in the warmer months (May though November) and valleys in the colder months (December though February) exists (Figure 1[illegible]). The large number of observations on 17 November 1977 represented a high, local density of animals with observations of [illegible].74 individuals per hour obtained (Godley et al. 1981).

83. The majority of observations on nearly all herp-patrols was of the stinkpot, Sternotherus odoratus. The abundance of this turtle accounted for the apparent seasonal patterns of the first two years (high densities in summer and fall and low densities in winter and spring). In SY[illegible], S. odoratus made up [illegible].2% of the total sample.

84. During SY1, 19 specimens of Nerodia cyclopion had been recorded from the site. Only one specimen was observed on herp-patrol after 4 May 197[illegible] and that was in November 1978, the same month the previous year when 1[illegible] individuals

were observed. No specimens were seen on herp-patrol after 10 November 1978. Reductions in density of this snake also were seen in the funnel trap results (Figure 12) and reflect their general decline as a result of habitat destruction.

55. Frog calling activity on the South Pool site decreased through the study, was highly seasonal, and varied by species and year (Figure 14). The sample consisted of six species and was dominated by Acris gryllus whose calling activity established the general seasonal pattern. Calling males of five species including A. gryllus were noted from late February through September with the peak of activity occurring in June through September depending on the year. Rana utricularia was heard calling only from November through early May with most activity between February and April.

Middle Pool

56. Nineteen species of amphibians and reptiles were recorded from the Middle Pool permanent site. The only species known from Middle Pool but not recorded on the permanent site was Hyla femoralis. The only Acris gryllus larva collected during the study was recorded from Middle Pool in SY1. In addition, the highest densities for permanent sites (Table A4, Bancroft et al. 1983) of the following species were recorded in Middle Pool: Rana grylio adults and larvae, Rana utricularia adults and larvae, Alligator mississippiensis, Regina alleni, and Thamnophis sauritus. Middle Pool was the only site where the relative densities of the salamanders Amphiuma means and Siren lacertina were nearly equal (Table A4, Bancroft et al. 1983). One of the two female alligators known to nest on Lake Conway successfully hatched 12 to 16 young in the marsh of the Middle Pool site in August 1977. Unfortunately, the nest site (marker 1110) of this female Alligator mississippiensis was destroyed in April 1978 and she apparently did not nest again on Lake Conway during our study.

57. The Middle Pool permanent site underwent dramatic habitat change during SY1. On 26 April 1978 all upland, marsh, and shoreline vegetation between markers [illegible] and 1120 and between markers 2000 and 2120 was cleared with bulldozers and draglines in preparation for housing (Godley et al. 1981). This activity removed more than half of the natural habitat along the inner transect that was used for funnel trapping and along the inner herp-patrol transect (2000 series) through the center of the Typha latifolia marsh. A 10-m

outer fringe of cattail (markers [illegible]-1200) and the habitat to the west of the cleared area ([illegible] m of the 1000, 2000, and 3000 series transects) were all that remained natural on the site. No other major disturbance occurred on the site through the remainder of the study.

86. A comparison of the number of species within Middle Pool and on the permanent site among years (Table 4) indicated a general reduction in diversity on the permanent site but not in the total pool through the study. For the total pool, samples in SY2 predicted 16 species (based on SY1 samples, Table 4 and Figure 2) and 16 were observed. In SY3, [illegible] species were found but the sample only predicted 15. On the permanent site, [illegible] species were predicted and observed in SY1. The smaller sample (N=[illegible]) of SY2 recorded 14 species and 14 were predicted. However, the SY3 sample predicted 14 but only [illegible] species were recorded. Noteworthy among the species not collected were *Amphiuma means*, *Pseudemys nelsoni*, and *Nerodia cyclopion*.

87. *Point analysis.* The distribution of [illegible] on the permanent site is shown for each year in Figures [illegible], [illegible], and [illegible]. [illegible] decreased in SY3 (Figure 17) even though the trapping effort was [illegible]. [illegible] species captured decreased from [illegible] in SY1 and SY2 to [illegible] in SY3. In SY1 and SY2 (Figures 15 and 16) animals were concentrated in the undisturbed portion of the habitat (markers 1150 to 1200). Sample sizes of individuals and species in SY3 were too small (N=[illegible]) to determine a meaningful pattern but some [illegible] of the area cleared in SY1 occurred (Figure 17), probably from the adjacent, undisturbed areas where *Regina alleni* and *Siren lacertina* were captured the previous year. A comparison of species distributions on the permanent site in SY1 before and after the habitat change (Godley et al. [illegible], Figures [illegible] and [illegible]) indicated that the removal of emergent vegetation severely reduced the density and diversity of the herpetofauna in the disturbed area and that surviving individuals apparently moved into the adjacent, undisturbed habitat. With the exception of the single [illegible] of *Rana utricularia* taken at marker [illegible], all captures of animals from markers [illegible] to [illegible] (Figure 15) were made before the habitat disruption occurred. Also, the numbers of individuals and species in the undisturbed area increased following the adjacent habitat disruption. Most captures on the permanent site in SY1 were in areas where organic detritus was deep and covered the bottom and where waterhyacinth (*Eichhornia crassipes*)

often was the dominant plant (Godley et al. 1981, Table A[illegible]). In that part of the transect where sand or shallow mud predominated, captures were few and occurred in the zone (markers 1[illegible]-1020) vegetated by Panicum hemitomon and Fuirena scirpoides. Traps set in an area (markers 1[illegible]-1[illegible]) dominated by Typha latifolia or Pontederia lanceolata produced no captures. Similar trends in vegetational association and capture rate were evident in SY2 and SY3.

[illegible]. Comparisons among years (Table A4, Bancroft et al. 19[illegible]) showed that four species including Siren lacertina (χ^2 = 14.[illegible]), Amphiuma means (χ^2 = 1[illegible].[illegible]), Rana utricularia larvae (χ^2 = [illegible]), and Seminatrix pygaea (χ^2 = [illegible]) had highly significant differences among years as determined by funnel trapping. In all of these except Rana utricularia, the means were higher in SY1 than in the other two years but were not different between SY2 and SY3. In Rana utricularia larvae, each year was distinct with the highest density recorded in SY2.

91. The spatial distributions of salamanders and reptiles as recorded from herp-patrols on the Middle Pool permanent site for the three years are presented in Figures 18, 19, and 20. For purposes of presentation, data from the 2000 and 4000 series transects are figured together. The peak of abundance seen (Figure 18) near the center of the 2000 series transect (markers 2060 to 2090) was the result of predisturbance observations in SY1. No specimens were recorded from this area after 25 April 1978 (Godley et al. 1981, Figures 11 and 12). The pattern shown in this area in Figure 19 was a disturbance picture of SY1. By SY3, nine captures of turtles between markers 2060 and 2090 resulted in a pattern similar to that of SY1. As previously discussed (Godley et al. 1981, paragraph 75) a marked decreased in mean observations from 1.21 individuals/trip to 0.40 individuals/trip occurred on the disturbed portion of the transect after clearing. No differences between the predisturbance and postdisturbance abundances ($\bar{X}$ = 1.20 individuals/trip) on the undisturbed portion of the 2000 series transect were detected.

92. The numbers of species and individuals recorded from the 2000 series transects decreased from [illegible] species and 119 individuals in SY1 (Figure 18) to [illegible] species and 12 individuals in SY2 (Figure 19) to 2 species and 19 individuals in SY3 (Figure 20). As expected, individuals of Sternotherus odoratus made up most of the SY2 and SY3 samples.

93. Even though the [illegible] series transect was not affected directly by tree lines used to clear part of the permanent site in April 1978, distributions clearly changed along the transect (Godley et al. 1981, Figures [illegible] and 14). Before clearing, the mean number of individuals was [illegible]/trip and was reduced to 1.[illegible]/trip afterwards. Little change was noted on the undisturbed portions of the [illegible] series transect where mean abundance went from 2.10/trip before disturbance to 1.[illegible]/trip after disturbance. Even though the number of species changed during the three study years from 4 to 1 to [illegible] along the [illegible] series transect and the number of individuals from [illegible] to [illegible] to [illegible] from SY1 to SY3, the pattern of distribution was very similar (Figures [illegible], [illegible], and 20). Peaks in abundance occurred in each year near marker [illegible] and to a lesser extent between markers 5140 and 5150. A very dense patch of *Potamogeton illinoensis* occurred near marker [illegible] and persisted there through [illegible] even though Eckardt et al. (1981) reported an overall reduction in percent coverage of this species in Middle Pool from [illegible] to [illegible] from [illegible] to [illegible]. The lake bottom was generally bare of vegetation from marker [illegible] to [illegible]. Near the end of the *Typha latifolia* stand (marker 7150) another dense patch of *P. illinoensis* occurred. Apparently, *Potamogeton illinoensis* provides excellent habitat for *Sternotherus odoratus* perhaps through its support of specific prey for the stinkpot.

94. The distributions of calling frogs changed as a result of the habitat modificiation in SY1. Godley et al. (1981, Figures 15 and 16) reported four species from markers 1000 to 1120 before disturbance and only two following disturbance. Both species of *Rana*, *Hyla cinerea*, and *Acris gryllus* were recorded in this area prior to disturbance but only *Acris gryllus* and *Bufo terrestris*, two species that inhabit and successfully call from grassy shore or bare beach, used the area following disturbance in SY1. All species were recorded in the undisturbed area (Figure 21). During SY2 *Acris gryllus* was the primary species calling from the disturbed area but a few individuals of *Hyla cinerea* (7), *Rana utricularia* (7), and *Rana grylio* (1) also were recorded (Figure 22). By SY3, these three species were abundant and dispersed throughout the area (Figure 23). *Hyla cinerea*, *Rana grylio*, and *Rana utricularia* call from areas of dense, emergent vegetation; this habitat had been removed completely in April of 1978 and only gradually reappeared by SY3.

With the redevelopment of the emergent, littoral zone vegetation, the four species moved back into the area.

95. Comparisons among years (Table A4, Bancroft et al. [illegible]) showed significant differences in two species as determined by herp-patrols. Adult Rana utricularia were significantly different (χ^2 = [illegible]) among years with the SY[illegible] sample being higher than those in the other two years which statistically were the same. Pseudemys floridana had significant differences among years (χ^2 = 10.66) with SY1 being higher than SY2 and SY[illegible] which were statistically the same.

96. Trap analysis. The temporal distributions of amphibians and reptiles taken in funnel traps are shown in Figure 24. An overall decrease in captures occurred through the three-year study. Adult and larval specimens of Rana grylio and Rana utricularia made up the bulk of the sample especially in the winter months and in SY[illegible] and SY[illegible]. Nerodia cyclopion was active from March through August in SY1 but recorded only once in April of SY2. No specimens were captured during the balance of SY2 or in SY[illegible]. The activity of Amphiuma means was restricted to the period from March through October. Small samples of the other species prevented meaningful analysis. During SY1, trap success was significantly greater on a disturbed section prior to habitat destruction than afterwards (χ^2 = [illegible], P < [illegible]). More animals were collected on the undisturbed section after habitat disruption than on the adjacent part of the transect before, but the difference was not significant (Godley et al. [illegible]).

97. In Figure 25, the distributions of salamanders and reptiles recorded on herp-patrols on the Middle Pool permanent sites combines the [illegible] and [illegible] series data for the three years. An overall decrease in abundance is obvious following the April [illegible] habitat disruption. Sternotherus odoratus dominated the three-year sample, especially in SY2 and SY[illegible] when it made up [illegible] of the sample. The high number (N=[illegible]) of S. odoratus recorded on [illegible] December [illegible] (Figure 25) was the result of an incredible concentration of [illegible] turtles in a 10-m^2 section of habitat between markers [illegible] and [illegible] of the [illegible] and [illegible] series transects. No other concentrations of this density were observed in Middle Pool during the remainder of the study.

98. Few frogs called on the Middle Pool site from October through February of SY1 and SY2 (Figure 26). However, 66 Rana utricularia were

recorded during the same period in SY3. Occasional individuals were calling in every month in SY3. *Rana grylio* usually began calling after the peak in *R. utricularia* and was more common during the later spring and summer months. *Hyla cinerea* called from May through September as did *Acris gryllus* but occasional individuals of the latter species sometimes began calling as early as March. The frog densities on the permanent site increased in SY3 to near SY1 densities. The low densities of SY2 probably were the result of the habitat destruction in April of 1978. *Rana grylio* was the only frog that showed highly significant increases (χ^2 = 1747) in relative densities (Table A6, Bancroft et al. 1983) in SY3; values for SY1 and SY2 were statistically similar.

East Pool

99. Only 17 of the 20 species known to occur in East Pool were recorded on the permanent site (Table A4, Bancroft et al. 1983). The toad *Bufo terrestris*, the turtle *Kinosternon subrubrum*, and the snake *Farancia abacura* are in East Pool but were not recorded from the permanent site. The salamander *Eurycea quadridigitata* was taken only once in the lake system and those two specimens were obtained in SY1 from the East Pool permanent site. The dwarf siren *Pseudobranchus striatus* was known only from East Pool and one of the two specimens was taken on the permanent site in SY3. The relative densities of three species (*Amphiuma means*, *Siren lacertina*, and *Hyla cinerea* larvae) were higher on East Pool than any other permanent site. All of these species were commonly associated with waterhyacinth (*Eichhornia crassipes*) communities, which dominated much of the site (see Tables A[illegible] and B[illegible]). The lowest densities of adult *Rana utricularia* and *Sternotherus odoratus* recorded on any permanent site occurred on the East Pool site.

100. In contrast to the conditions described for South and Middle Pools, no habitat destruction occurred on the East Pool permanent site during the study. However, some changes in the depth of the detrital layer on the transect and replacement of some plant species by *Eichhornia crassipes* were noted. Also, the percent cover and standing crop of *Potamogeton illinoensis* decreased dramatically as a result of the white amur (a reduction of [illegible]1.1% was noted from August 1977 to August 1980; Schardt et al. 1981).

101. The species diversity for the total of East Pool and the East Pool

permanent site is presented in Table 5. Applying the same logic as described for the South Pool comparisons, little change occurred in the East Pool community through the three years. The same number of species recorded in SY1 were also there in SY3 with a smaller sample size. For the total pool, the SY1 sample predicted (see first year's data in Table 5 and Figure 2) only 14 species, but 17 were recorded. The permanent site samples recorded 15 species (16 predicted) in SY1, 14 (11 predicted) in SY2, and 15 (14 predicted) in SY3.

102. Certain characteristics of the East Pool permanent site and its inclusive samples are important to understanding the observed diversity. First, the East Pool site is insular and in this regard different from the four other sites. As a result, a few species that were common elsewhere in the pool or on the other permanent sites are unknown from the East Pool site and include _Bufo terrestris_ and _Gastrophryne carolinensis_. Also, the salamander _Eurycea quadridigitata_ probably was common on most sites prior to upland development but now is known only from the undeveloped island in East Pool. The fact that there has been no development on or adjacent to the East Pool permanent site makes it different from the other permanent sites and may have resulted in its relatively higher diversity in SY3. Finally, trapping area and effort in East Pool (Table A4, Bancroft et al. 1983) was expanded considerably in SY3 and this may have contributed to the maintenance of a species diversity equivalent to that recorded in SY1. The species diversity on all other permanent sites was lower in SY3 than in SY1. The extended trapping effort is discussed separately but included in the figures for the point and trip analyses.

103. Point analysis. The distribution of captures in funnel traps was more uniform on the East Pool site than on other permanent sites in SY1 (Figure 25) and SY2 (Figure 26). This probably reflects the relatively high habitat homogeneity in East Pool compared with other permanent sites. Because captures on the original site in SY3 were only 5.3% of those in SY1 and 12.9% of those in SY2, no meaningful comparisons can be made for the SY3 data. Traps set from markers 1090 to 1200 captured 66.5% of the sample in SY1 and 71.4% of the sample in SY2. This area was dominated by waterhyacinth in SY1 (Godley et al. 1981, Table A3) which spread through most of the permanent site in SY2 and SY3 (Appendices A, Table A4, and B, Table B5). _Amphiuma means_ was captured at every marker in SY1 (Figure 27) and every marker except 1040, 1050, and 1160 in

[illegible] (Figure [illegible]). In SY[illegible] only two specimens were recorded on the original transect, both from marker [illegible] (Figure 2[illegible]). In SY1 Siren lacertina was taken at all stations except between [illegible] and [illegible]. In SY[illegible] S. lacertina was recorded from only eight of the [illegible] stations [illegible] from [illegible] to [illegible]. [illegible] two individuals were taken on the original site in SY[illegible], one at marker [illegible] and the other at marker [illegible]. Nerodia cyclopion was more common ([illegible] of [illegible] individuals recorded in SY1) at stations with greater plant species diversity [illegible]. Only three individuals were taken in funnel traps in SY2 and four from the original site in SY[illegible]. All were from markers with greater recorded plant diversity than adjacent stations where waterhyacinth was the dominant plant.

[illegible]. The extended trapping in SY[illegible] covered the area from marker [illegible] to marker [illegible]. As mentioned in paragraph [illegible]4, this extended trapping site was set up to determine if declining populations of amphibians and reptiles on the permanent site were the result of repeated trapping and human disturbance or were characteristic of the entire island. Large portions of this extension (especially between markers [illegible] and [illegible]) were comparable in habitat characteristics and presumed habitat quality to the original permanent site (see [illegible] A[illegible] and B[illegible]). Of the [illegible] animals taken on this extended site (Figure [illegible]), [illegible] were Amphiuma means. If the relative density in SY4 of Amphiuma means ([illegible] [illegible], Bancroft et al. [illegible]), the commonest funnel-trapped species in [illegible], is partitioned into a density from the original permanent site [illegible] and one from the extended site, the following values are obtained: original site relative density (0.[illegible]), extended site (1.[illegible]). Even though the density on the new site was 4.[illegible] times higher than that on the original site in SY[illegible], the density of A. means was 79.3% lower than the SY[illegible] density and [illegible] lower than the SY1 density on the permanent site, and was considerably below that expected for an undisturbed and untrapped section of high quality habitat. These comparisons clearly indicate a general reduction in the density of Amphiuma means (and to a lesser extent for the other species sampled by funnel trapping) on the island and suggest that our disturbance and repeated trapping contributed little to the dramatic decline of the A. means population on the East Pool permanent site. To some extent Amphiuma means may become trap-shy with repeated captures.

105. Predation by river otter (Lutra canadensis) may have contributed to the decline in capture rate and resulted in a loss of a substantial proportion of the populations of Amphiuma means, Siren lacertina, and Nerodia cyclopion. From the middle of SY2 through the remainder of the study, some traps on the East Pool site were raided on 40-50% of the trips. Bait was removed and eaten as were captured animals. The otters typically visited most traps in the line. However, even on trips when otters did not raid the traps, relatively few captures were recorded on the permanent sites or on the extended trapline. We conclude that human disturbance, otter predation, and trap shyness contributed to the apparent population declines, especially of A. means on the East Pool permanent site. These factors, however, cannot explain the observed low density on the extended trapline. We assume that these population fluctuations are largely the result of unknown natural causes.

106. Comparisons of relative densities among years for the East Pool permanent site showed significant declines in several funnel-trapped species. Differences in Amphiuma means densities among years (Table A4, Bancroft et al. 1983) were highly significant (χ^2 = [illegible]). The same pattern existed for Siren lacertina (χ^2 = 64.36). Larvae of Hyla cinerea (χ^2 = 32.83) and Nerodia cyclopion (χ^2 = 22.06) were highly significant with SY1 different from SY2 and SY3 which were not different from each other. The larvae of Rana utricularia were highly significantly different among years (χ^2 = 28.53) with no significant difference between SY1 and SY2 densities but both were higher than SY3. The larvae of Rana grylio also were highly significantly different among years (χ^2 = 10.86) with a significant decline only between SY1 and SY3. Adults of Rana grylio showed a significant decline among years (χ^2 = 6.38) with the same pattern as described for R. grylio larvae.

107. Comparisons of the distributions of salamanders and reptiles recorded on herp-patrol on the East Pool site are shown in Figures 30, 31, and 32. The decrease in sample size from SY1 (N=60) to SY2 (N=22) and subsequent increase in SY3 (N=46) does not correspond to the total hours spent on herp-patrol, i.e., the mean total number of animals per hour was 5.71 in SY1, 2.44 in SY2, and 4.90 in SY3. The species composition of the sample also changed through the three years. The turtle Sternotherus odoratus made up 66.3% of the sample in SY1 (Figure 30), 20.7% in SY2 (Figure 31), and 1.5% in

SY3 (Figure 32). During the same period, the percent of Siren lacertina increased from 1.67% in SY1 to 22.7% in SY2 to 28.3% in SY3 and that of Pseudemys floridana from 20.0% in SY1 to 36.4% in SY2 to 45.6% in SY3. A majority of animals recorded on herp-patrol were from the second half of the transect (markers 2110 to 2200) and included 71.7% of the sample in SY1, 72.7% in SY2, and 73.9% in SY3. The second half of the transect was dominated by a dense cover of waterhyacinth near the shore. Extensive beds of Potamogeton illinoensis also covered the lake bottom in SY1 especially along the second half of the transect. By August of SY3, the percent cover of this plant in East Pool had been reduced from 57% to 7% and it was essentially gone from the northern side of the island (Schardt et al. 1981). At the same time, beds of Vallisneria americana were constant or expanded in coverage and density on the transect, or increased from 15% to 40% in the pool (Schardt et al. 1981, Figure J10). Particularly noticeable were dense beds of Vallisneria offshore from markers 2140 to 2200. Declines in Sternotherus odoratus densities have been noted previously in South Pool and correlated with the decrease in coverage and density of Potamogeton. The cover provided by Vallisneria beds apparently is important to maintenance of populations of Siren lacertina; Pseudemys floridana is known to feed on Vallisneria extensively (Bancroft et al. 1983). In addition, the increase in waterhyacinth during SY2 and SY3 provided ideal cover for large P. floridana and a suitable basking area during the winter months.

10[illegible]. The distributions of calling frogs on the permanent site in East Pool are shown in Figures 33, 34, and 35. Hyla cinerea was especially common at this site and individuals called from every marker in each year. Distributions varied from year to year but densities were usually lowest between markers [illegible] and 11[illegible]. Coincidentally, this area had relatively high densities of the snake Nerodia cyclopion. As was the case in other pools, frog density generally increased in SY3 in East Pool.

[illegible]. Trap analysis. Figure [illegible] shows the distribution of funnel-trapped amphibians and reptiles on the East Pool permanent site through the three-year study. Most of the pattern in Figure [illegible] is defined by the distribution of Amphiuma means. The low activity characteristic of the winter months of [illegible] followed by high activity during the remainder of SY1 was not repeated in SY2 or SY3. Although samples sizes were smaller, the highest peak in SY2

occurred in January of [illegible] and trips during June, August, and September of 19[illegible] recorded no animal activity. Larvae of the frogs *Hyla cinerea*, *Rana grylio*, and *Rana utricularia* were collected from July through September in SY1 in April, May, July, and August of SY2 and February and September of SY3. The February record of *R. grylio* suggests that larvae of that species may take six months or more before metamorphosing. Results of trapping the extended area in SY3 are shown as an insert in Figure [illegible] (see paragraphs 1[illegible]4-1[illegible]5).

110. The distributions of salamanders and reptiles recorded on the East Pool permanent site on herp-patrols through the three years is shown in Figure 37. The trend towards a decline in overall activity is the result of the large numbers of *Sternotherus odoratus* that were taken early in SY1. This species decreased in abundance on the East Pool site through the three years. In contrast, *Pseudemys floridana* increased in abundance. Peaks of activity in *P. floridana* were concentrated in December and January of SY1 and SY3. Observations in SY2 were low and amounted to 29.3% of those in SY1 and 49.[illegible]% of those in SY3. From January through June of 1979 only seven animals of four species were recorded (Figure 37).

111. Calling frogs showed distinct peaks from April through September of each year on the East Pool permanent site (Figure 38). Most of the summer activity was due to calling *Hyla cinerea* and *Acris gryllus* with a few individuals of *Rana grylio*. During the study, the number of calling *Acris gryllus* increased on the permanent site while that of *Hyla cinerea* decreased. *Acris gryllus* showed a significant increase in relative density (X^2 = 6.57, P = 0.04) among years with SY3 densities distinctly higher than those of SY1 or SY2 which were statistically the same (Table A6, Bancroft et al. 1983). The fourth frog species on the site, *Rana utricularia*, called primarily from November through March with a few individuals recorded in April or May (Figure 38).

West Pool

112. The West Pool permanent site had the lowest number of species (N=15) of any permanent site and in this sense paralleled the low diversity (N=17) of the pool (Table 6). The low number of species in West Pool was in part attributable to the absence of several species of snakes (only two of seven species in the lake are known from West Pool: *Nerodia cyclopion* and *N.*

fasciata) and the widely distributed turtle Kinosternon baurii. Also absent from the site but known from the pool are Trionyx ferox and Alligator mississippiensis. Several species had their lowest densities of any permanent site on West Pool, including Acris gryllus, Kinosternon subrubrum, Pseudemys floridana, and P. nelsoni. Sternotherus odoratus, the most abundant turtle on Lake Conway, also had a low density in West Pool. Interestingly, the highest number of total observations for Gastrophryne carolinensis and Hyla cinerea was recorded from this site.

113. The West Pool site did not suffer the habitat destruction characteristic of South and Middle Pools. However, some natural shifts in plant coverage and dominance were noted (Appendices A, Table A4, and B, Table B4). Fuirena scirpoidea and Panicum repens filled in most of the open-water habitat between markers [illegible] and [illegible]. Waterhyacinth increased considerably in coverage as did Typha latifolia beds. Between August [illegible] and August [illegible], Hydrilla verticillata was eliminated from the pool and Potamogeton illinoensis was reduced from 14% to 2% coverage ([illegible] et al. [illegible]). During the same period, most Vallisneria americana beds increased in size ([illegible] et al. [illegible], Figure [illegible]), but plants showed evidence of stem height reduction, the apparent result of cropping by the white amur.

114. The number of species and sample sizes for the total West Pool and the permanent site are shown in Table 6. All species known to occur in the pool were recorded in SY2. This number ([illegible]) was three species higher than predicted from the SY1 curve (Table 6 and Figure [illegible]) and included Rana grylio and Nerodia fasciata, species known only from SY2 in West Pool. The SY3 sample (N=44[illegible]) had one less species than was predicted from the SY1 data. Trends on the permanent site were similar to those in the pool with more species known from SY2 than the other years. For the permanent site, SY1 diversity was two species below the pool diversity and that of SY2 was one species less than predicted. The SY3 sample recorded only nine species from the permanent site, three less than expected. Species not recorded in SY3 included Siren lacertina, Acris gryllus, Nerodia cyclopion, and N. fasciata.

115. Point analysis. The spatial distributions of amphibians and reptiles sampled with funnel traps on the West Pool permanent site are shown in Figures [illegible], 40, and 41. As with results from the other permanent sites,

densities as measured by funnel traps decreased throughout the three years. _Amphiuma means_ made up the bulk of each year's sample ([illegible] in CY1, [illegible] in CY2, [illegible] in CY3) and was widely distributed through the site except from markers [illegible] through [illegible]. No animals were captured in this part of the site during the three-year study even though the area showed considerable change in plant cover and composition (compare data from Godley et al. [illegible], Table A4, to those in Tables A4 and B4 of this report). The trend seen in CY1 (Godley et al. [illegible]), where nonbeach trapping sites dominated by waterhyacinth produced the greatest proportion of capture ([illegible]) with only [illegible] of the traps, apparently continued into CY2 even though sample size was smaller. Those markers dominated by waterhyacinth accounted for 74.4% of the CY2 captures with [illegible] of the trapping effort. All four captures in CY3 (Figure 4[illegible]) were from sites dominated by waterhyacinth (Table B4).

110. Highly significant differences among years were found for the two salamanders _Siren lacertina_ (χ^2 = 12.46) and _Amphiuma means_ (χ^2 = [illegible]). _Siren lacertina_ densities from funnel traps were lower in CY3 than in CY1 and CY2 which were statistically the same. Mean densities for _Amphiuma means_ were different each year. No other species showed significant differences among years on the West Pool site.

111. The spatial distributions of species recorded on herp-patrols are shown in Figures 4[illegible], 43, and 44. A reduction in annual density occurred from CY1 to CY3 on the West Pool site. Patterns among years were not obvious. In contrast to the funnel-trapped sample, CY1 animals were widely distributed even in the area from marker [illegible] to 80. _Sternotherus odoratus_ made up [illegible] of the CY1 sample and showed concentrations near marker [illegible] in an area where a dense stand of _Potamogeton illinoensis_ occurred in shallow water (Godley et al. [illegible]); this stand disappeared from the area in later years as did stinkpots. A high density of _Siren lacertina_ was noted near marker [illegible]. Rare individuals of _Nerodia cyclopion_ were spaced across most of the undisturbed shoreline (markers [illegible] to [illegible]). In CY2 _Sternotherus odoratus_ made up [illegible] of the sample and individuals were concentrated between markers 2[illegible] and [illegible]. None was recorded within 4[illegible] m of marker [illegible]. No _Siren lacertina_ and only one _Nerodia cyclopion_ (at marker [illegible]) were seen. By CY3 (Figure 44) [illegible] of the sample was _Sternotherus odoratus_ and individuals were concentrated from markers 11[illegible]

through [illegible] and from [illegible] through [illegible]. [illegible] individual of three other turtle species made up the remainder of the CY[illegible] sample.

[illegible]. The distributions of calling frogs on the West Pool site were slightly more clumped in CY[illegible] and CY[illegible] than in CY[illegible] (Figures 4[illegible], 4[illegible], and 4[illegible]). In CY[illegible] *Hyla cinerea* made up [illegible] of the sample and called from [illegible] of the sites. However, [illegible] of the *H. cinerea* called from seven markers [illegible]. In CY[illegible], *H. cinerea* made up [illegible] of the sample and called from [illegible] of the available sites. No distinct clusters of males were distinguishable. In CY[illegible] (Figure 4[illegible]) *H. cinerea* made up [illegible] of the sample and called from [illegible] of the sites. Clusters existed around markers [illegible] and [illegible], [illegible], and [illegible] but did not contribute as major a part to the sample as did the clumps in CY[illegible]. The density and distribution of *Gastrophryne carolinensis* [illegible] from [illegible] individuals [illegible] calling at [illegible] sites in CY[illegible], to [illegible] individuals [illegible] calling at [illegible] sites in CY[illegible], to [illegible] individuals [illegible] calling from [illegible] sites in CY[illegible] (Figures 4[illegible] to 4[illegible]). Also in CY[illegible] *Bufo* [illegible] was recorded calling from [illegible] sites [illegible] the [illegible] area of the [illegible]. *Rana* [illegible] was recorded only from marker [illegible] in CY[illegible]. [illegible], the [illegible] West Pool [illegible] site was not suitable for this species.

[illegible]. [illegible] The [illegible] distributions of amphibians and reptiles [illegible] with [illegible] traps on the West Pool site are shown in Figure 4[illegible]. [illegible] through February had many fewer catches than the [illegible] through August. Because of small sample sizes in CY[illegible] and CY[illegible], the [illegible] established in CY[illegible] (Bailey et al. 19[illegible]) was not evident in [illegible]. Most captures were of *Ambystoma* [illegible] and occurred in every month [illegible] December and January. Forty-four individuals were [illegible] in traps between [illegible] May and [illegible] September [illegible] with [illegible] of them trapped on [illegible] July.

[illegible]. The [illegible] distributions of salamanders and reptiles on the West Pool site are given in Figure 4[illegible]. Peaks of abundance occurred in September of [illegible], in March of [illegible], in March of [illegible], and February of [illegible], and consisted primarily of individuals of *Ambystoma* [illegible]. No specimens of [illegible] were [illegible] from [illegible] until March of the first two years. Observations declined dramatically in late CY[illegible] and CY[illegible]. From May of 19[illegible] until September of 19[illegible], [illegible] trips [illegible] only [illegible] animals of four species and those [illegible] were recorded on [illegible] trips.

[illegible]. Three major peaks in frog activity are identified in Figure [illegible] and vary temporally from year to year. In [illegible], the peak in summer breeding occurred in July and August, consisted of three species, and was preceded by some activity in May. In [illegible], the summer breeding was spread from late June through late August and included five species. In [illegible], the major calling activity was from May through July with a secondary peak in September and included four species. Hyla cinerea reached its greatest densities on West Pool and accounted for most of the pattern seen in Figure [illegible]. Rana utricularia was the only species calling from October [illegible] through April of [illegible] and from November of [illegible] to April [illegible]. Even though most individuals restricted their calling to the colder months, a few R. utricularia called on warm nights in late May, June, and July on the West Pool site. Bufo terrestris was noted calling only in May of [illegible]. Gastrophryne carolinensis called in all months from May through September.

Gatlin Canal

[illegible]. All of the [illegible] species recorded from Lake Gatlin (Figure [illegible]) have been taken on the permanent site in Gatlin Canal (Table A[illegible], Bancroft et al. [illegible]). Gatlin Canal, typical of the many shallow, dredged canals in the system, had a surprisingly high number of species for a disturbed, eutrophic, man-made habitat. The highest density of Bufo terrestris of any permanent site and the only records of Bufo terrestris larvae were from Gatlin Canal. Rana utricularia densities were also very high compared to other sites. The Gatlin Canal site was the only place where all species of native aquatic turtles were recorded and the only permanent site where Deirochelys reticularia was taken. The introduced turtle Pseudemys scripta has yet to be taken in Gatlin Canal. In addition to the high turtle diversity, the highest density of Pseudemys nelsoni was recorded in Gatlin Canal; high densities also characterized the populations of Pseudemys floridana and Sternotherus odoratus at this site. Considering the sampling effort (especially with herp-patrols, Table A[illegible], Bancroft et al. [illegible]), the diversity and density of snakes was relatively low, even though the highest density of Nerodia fasciata for any site was recorded in Gatlin Canal.

123. The numbers of species of amphibians and reptiles in the total Lake Gatlin sample and the permanent site sample for each year are shown in Table

[illegible]. The total lake contained [illegible] species, the last of which was recorded in [illegible] at a sample size of [illegible] individuals. In general, the species diversity in each year was equal to or higher than that extrapolated from the [illegible] curve (Table [illegible] and Figure [illegible]). For the total lake, the sample in [illegible] predicted [illegible] and [illegible] species were recorded; in [illegible] the sample predicted [illegible] and [illegible] species were recorded. In each instance the addition of three or four more individuals to the sample would have raised the predicted species number to equal the recorded number. For the permanent site, the [illegible] sample recorded the number of species expected; in [illegible], the small sample predicted [illegible] and [illegible] species were recorded; in [illegible], the sample predicted [illegible] and [illegible] were recorded. In [illegible], nine more individuals in the permanent site sample would have raised the expected diversity to that which was recorded (N=[illegible]).

[illegible]. The Gatlin Canal site experienced several changes in plant structure and distribution during the study. The density of [illegible] decreased in [illegible] and Eichhornia crassipes increased dramatically during [illegible] and [illegible]. Herbicide was used to control the water hyacinth in [illegible] and [illegible] to check the spread of [illegible] during the summer (July) of [illegible]. In spite of these modifications, the herpetofaunal diversity in Gatlin remained high even though the total abundances decreased. In part, this high diversity is the result of the diverse array of microhabitats within the canal (Table A[illegible], [illegible]). The location of Gatlin Canal between two other major, alternate habitats (east [illegible] and Lake Gatlin, Figure [illegible]) may have contributed to the maintenance of the relatively high diversity. The high diversity is even more surprising considering that most of the shoreline bordering Gatlin Canal consisted of yards mowed almost to the waterline. The lack of much terrestrial habitat and the level of development and proximity of humans, most of whom have a tendency to kill snakes, certainly lowered the snake diversity.

1[illegible]5. Point analysis. The spatial distributions of amphibians and reptiles at funnel trap stations for the three years along the Gatlin Canal site are shown in Figures 51, 52, and 53. Because part of the trapline had to be moved from the east side to the west side of the canal in February 1979 (see paragraph 4[illegible]), Figure 5[illegible] contains data from both sides of the canal. Because habitats on each side of the canal were different, comparisons of funnel-trapped animals among years along the canal were difficult. Trapping

effort was more consistent among years in Gatlin Canal than any other site (Table A4, Bancroft et al. 198[illegible]). Even so, capture rates were low for all three years with the largest sample (N=[illegible]) having been taken in SY[illegible] and the smallest (N=1[illegible]) in SY3. Trends seen in other pools were evident in Gatlin Canal. Densities of Amphiuma means went from seven in SY1 to one in SY3 and those of Nerodia cyclopion from four in SY1 to one in SY3. Sternotherus odoratus also decreased in the funnel trap sample from ten in SY1 to three in SY3. Chelydra serpentina was the only species to show highly significant differences (χ^2 = [illegible].44) among years when five captures were recorded in SY2 and none in SY1 or SY3.

126. The distributions of salamanders and reptiles recorded on herp-patrols during the study are shown for the Gatlin Canal permanent sites (west side - [illegible] series; east side - [illegible] series) in Figures [illegible]4, [illegible]5, and [illegible]6. Herp-patrols in September 198[illegible] only included the area from the mouth of Gatlin Canal to marker [illegible]. The remaining [illegible] m of the canal was blocked with waterhyacinth and impassable to boats. Samples decreased by [illegible].6% from SY1 to SY2 and [illegible] from SY2 to SY3. Sternotherus odoratus was the most common species in Gatlin Canal in SY1 and SY2 but was replaced numerically by Pseudemys floridana in SY3 (Figure [illegible]). The largest concentration of stinkpots occurred at the mouth of Gatlin Canal (markers [illegible]-4[illegible], 1[illegible]-104[illegible]), particularly on the west side of the canal where a large patch of Nuphar luteum was established. Other areas in Gatlin Canal that produced large numbers of stinkpots were marker [illegible] in SY1 and SY2 and markers 1[illegible] to 1[illegible]4[illegible] in SY1. Individuals of Pseudemys floridana and P. nelsoni were often concentrated around Nuphar beds (e.g., markers [illegible] and [illegible] and 10[illegible] and 1[illegible], 4[illegible] to [illegible] and 14[illegible] to 145, 1[illegible]). Because of the diversity of habitats and the relatively narrow nature of the canal, any association of turtles with specific habitats was not obvious from herp-patrol data. Only Sternotherus odoratus showed highly significant differences (χ^2 = [illegible]) among years in Gatlin Canal. The relative density of stinkpots decreased each year.

1[illegible]. Relatively few frogs were recorded on the Gatlin Canal shoreline sites in SY[illegible] as compared to other sites and years. Frogs were more common in Gatlin Canal in SY2 and SY3. The distributions of frogs during the three-year study are shown in Figures [illegible], [illegible], and [illegible]. Distributions were noticeably patchy

with concentrations of Hyla cinerea in areas dominated by Eichhornia crassipes usually with some Typha latifolia (e.g., markers 160-180). Bufo terrestris called from open, beach habitats or in areas where mowed lawns came to the water's edge (e.g., markers 1000, 1400-1430). Adults of Rana grylio showed a highly significant difference (X^2 = 14.80) among years in Gatlin Canal as did those of Hyla cinerea (X^2 = 6.74). A distinct increase in relative densities, especially in SY3, made each year statistically different for R. grylio but only made SY1 different from SY3 for H. cinerea.

128. Trip analysis. The temporal distributions and abundances of amphibians and reptiles captured in funnel traps in Gatlin Canal are shown in Figure 60. Most captures occurred between May and November of SY1 and SY2 with peaks in June, July, and August of both years and in November of [illegible]. Very few animals were taken in SY3 but a peak occurred in September [illegible]. For an unknown reason no animals were captured from November of 1977 through February of [illegible]. A few were captured during these months in SY2 and SY3. Amphiuma means was active througout the year and Nerodia cyclopion was recorded from June through November.

129. The distributions of salamanders and reptiles observed on herp-patrols in Gatlin Canal during the study are shown in Figure 61. The density of turtles, especially Sternotherus odoratus, was high early in the study but gradually decreased through September of [illegible]. After the first year, peaks of turtle activity occurred in February and August [illegible] and June of each year. No animals were observed in Gatlin Canal on three trips in February of [illegible].

130. The temporal distributions of calling frogs in Gatlin Canal are shown in Figure 62. A clear trend towards increasing activity and density from SY1 to SY3 is evident with the frogs. The bulk of the activity was concentrated during July and August of SY1 and SY2 but began earlier (May) and extended through August in SY3. Most of the summer activity was made up of Hyla cinerea, Bufo terrestris, and Rana grylio. Bufo terrestris showed distinct patterns in each year. Males were recorded calling in April and May of [illegible] and [illegible] and again in August of [illegible], and in July of 1979. Rana utricularia called primarily from November through March but a few individuals were calling during the warmer months from June through September. The other frog species

from Gatlin Canal generally called during the summer months.

Yearly Comparisons - Lake Conway

131. A comparison (Table 8) of the numbers of individuals and species recorded in all of Lake Conway with the permanent sites only (all pools combined) shows an overall decrease of six species (three each year) from SY1 to SY3 in both the total lake and the permanent sites. The permanent site sample for the three years combined (N=[illegible],754) was only 65.[illegible]% of the total lake sample. Yet, only one species recorded from the total lake was not also found on the permanent sites. Four adults of that species *Hyla femoralis* were calling on one night in SY1 in Middle Pool. Thus, the permanent sites and their samples adequately represented the Lake Conway environment and its herpetofauna. The decrease in individuals between SY1 and SY2 was 4[illegible]% but the decrease in species was only 11.1%. In SY3, the individuals sampled were 21.7% less than in SY2 while the species number decreased by 12.5%. Similar trends occurred on the permanent sites (Table 8). From SY1 to SY2, the sample of individuals decreased 55.1% but species number went down only [illegible]%. In SY3, the sample was only down 9.0% while the number of species sampled decreased 1[illegible].0% from the SY2 value. The sampling effort was generally comparable among the three years (see Methods section) or showed slight increases (funnel traps, Table A4, Bancroft et al. 198[illegible]). Yet, densities of most species decreased and diversity went down during the three-year study. Most of the decrease in densities occurred between SY1 and SY2. For the total lake sample, the SY2 sample predicted (based on SY1 curve in Figure 2 and data in Table 8) [illegible] species but only 24 were recorded. In SY3, the predicted species number was 26 but only 21 were recorded. A similar pattern for the permanent sites existed. The SY1 sample predicted 26 and 26 species were recorded. In SY2, the predicted number of 22 was one less than the recorded number of 23 species. In SY3, however, the predicted species number was 22 but only 20 were recorded. Species numbers in the total lake were below the expected in SY2 and SY3, but on the permanent sites, only below the expected in SY3.

132. Ten species showed significant yearly changes in relative densities

in the same system: Amphiuma means, Siren lacertina, Hyla cinerea, Rana grylio, Rana utricularia, Chelydra serpentina, Kinosternon subrubrum, Sternotherus odoratus, Pseudemys floridana, and Nerodia cyclopion. Two salamanders, larvae of two frogs, three turtles, and one snake showed significant changes as detected by funnel trap analysis. One turtle showed significant differences in relative densities with the herp-patrol and funnel trap analyses. One frog and one turtle showed significant differences on herp-patrol.

[illegible]. The two large, aquatic salamanders were taken primarily in funnel traps and had highly significant differences among years (Amphiuma means, χ^2 = [illegible]; Siren lacertina, χ^2 = [illegible]) with a significant decrease in relative density in most pools through the study. Larvae of Hyla cinerea and those of Rana utricularia showed highly significant changes in relative densities through the study. The densities of Hyla cinerea larvae decreased and were highly significant among years (χ^2 = [illegible]) with densities in SY1 statistically different from those in SY2 and SY3 which were the same. Differences in relative densities of Rana utricularia larvae were highly significant among years (χ^2 = [illegible]) and showed a peak in SY2 and a large decrease in SY3. The relative densities of the turtle Chelydra serpentina were significant among years (χ^2 = [illegible]) with a slight increase in funnel trap captures in SY2. The population of Kinosternon subrubrum decreased in relative density with SY1 values statistically different from SY2 and SY3 values which were not distinct from each other. For this turtle, a highly significant difference among years (χ^2 = [illegible]) was shown by the funnel trap analysis. Populations of Nerodia cyclopion decreased sharply between SY1 and SY2 but with relative densities of SY2 and SY3 showing no significant difference. Overall relative densities were highly significant (χ^2 = [illegible]) among years for this snake. Sternotherus odoratus was the most common species of the [illegible] and showed highly significant differences among years for the funnel trap analysis (χ^2 = [illegible]) and highly significant differences among years for the herp-patrol analysis (χ^2 = [illegible]) with the relative densities in SY1 statistically different from those in SY2 and SY3 which were very similar to each other. The populations of Rana grylio increased in relative densities with those of SY3 significantly higher than those of SY1 or SY2 which were the same. A highly significant difference among

years (X^2 = 11.53) was shown by the breeding season analysis of herp-patrol data. The populations of Pseudemys floridana decreased in density with values for SY1 being statistically higher than those for SY2 and SY3 which were the same. The relative densities of this turtle from herp-patrol data were significantly different among years (X^2 = 8.06). No other species showed significant differences among years.

Deepwater Trapping Stations

134. A single salamander, Siren lacertina, was collected in 244 trap-days at deepwater sampling sites during SY1 in 1.2 m of water on the East Pool site during the July 1978 sampling period (Godley et al. 1981). The mean trap success of amphibians and reptiles at deepwater sites was 0.41 individuals/100 trap-days. This value was 40.92 times lower than the mean for all amphibians and reptiles ($\bar{X}$ = 16.77 individuals/100 trap-days) and 5.72 times lower than the mean for S. lacertina ($\bar{X}$ = 2.34 individuals/100 trap-days) trapped at permanent shoreline sites during the same period. Deepwater trapping was discontinued in SY2 and SY3.

PART V: DISCUSSION AND CONCLUSIONS

135. The herpetofauna of Lake Conway is a diverse and complex assemblage of amphibians and reptiles. Some species by virtue of their size or abundance are important, integral components of the ecosystem and play primary roles in the food webs and community dynamics of the lake. Other species, by virtue of their low densities or marginal occurrences, probably are less important components of the systems. The functional roles of these species are not well understood and remain to be defined. Included in the category of primary species are the salamanders *Amphiuma means* and *Siren lacertina*; the frogs *Acris gryllus*, *Hyla cinerea*, *Rana grylio*, and *Rana utricularia*; the alligator *Alligator mississippiensis*; the turtles *Chelydra serpentina*, *Kinosternon subrubrum*, *Pseudemys floridana*, *Pseudemys nelsoni*, and *Sternotherus odoratus*; and the snake *Nerodia cyclopion*.

136. An examination and understanding of the population dynamics and ecology of these 13 species during the three-year study adequately illustrate the major trends that characterize the amphibian and reptile populations on Lake Conway. In addition, the data gathered during the study provide a much better understanding of the functional role that each species have in the overall lake system. With these new insights we have been able to interpret the observed changes in density and composition of certain species with some degree of reliability and, in specific instances, to attribute these changes to the complex of environmental factors acting on the system including the impact of the white amur as a plant control agent.

137. The selection of Lake Conway for the LSOMT was unfortunate from the viewpoint of the amphibian and reptile populations because of confounding influences of human disturbance on the system. The destruction and loss of both terrestrial and aquatic littoral zone habitats for housing and beach development have had a significant negative effect on all species of amphibians and reptiles on Lake Conway. In certain instances, significant portions of populations were eliminated by land clearing and site preparation practices. In other instances, species were affected indirectly by loss of suitable foraging habitat, calling sites, nesting areas, and food resources. High mortality in snake populations as a result of direct human activity and in

populations of larger turtles from excessive boat traffic has been a significant factor influencing the population dynamics of these species. The impact of various kinds of human disturbance, both during and prior to our work, makes it difficult to isolate specific causes responsible for the population declines documented for many species on the lake. However, reductions in the density of certain open-water species clearly are correlated with decreases in aquatic plant biomass as a result of the feeding activity of the white amur. These declines apparently are not confounded by human disturbance factors. Table 4 summarizes density responses of the major groups of the 15 primary species of amphibians and reptiles and attempts to identify and rank the major causative agents affecting their densities. Unfortunately, comparative data from other detailed integrative studies of a community of amphibians and reptiles in an aquatic environment comparable to Lake Conway are unavailable.

138. Populations of the two large salamanders decreased significantly through the study. Habitat loss through human disturbance resulted in major decreases in two pools but does not explain the concomitant declines in the other three pools. A significant change in the density of open-water populations of _Siren lacertina_ occurred (data presented in Bancroft et al. 1983) as extensive areas of _Potamogeton illinoensis_ were reduced or eliminated by white amur feeding. Mortality from boat traffic also was documented for _Siren lacertina_. Both of these factors were considered minor compared with the impact of habitat loss on _Amphiuma means_ and _S. lacertina_. The facts that individuals of _Siren_ were never recaptured in funnel traps and that recaptures of _Amphiuma_ decreased through the study suggest that both species may have become trap-shy and, therefore, less subject to detection. Also, the documented decrease in water level of the lake since 1977 may have resulted in primary littoral zone habitat going dry and eventually resulting in a decline of salamander populations through reduction and loss of nesting sites. Finally, Hurricane David may have contributed to the decline of salamander densities in West Pool where considerable habitat disruption occurred. Relatively few animals compared to the previous year were recorded in West Pool for several months following the hurricane.

139. Frogs showed an overall increase in density through the study with

documented decreases in those pools where considerable habitat destruction occurred (e.g., South and Middle Pools). In addition, water levels recorded by the U. S. Geological Survey were lower during the [illegible] than at any time during the previous 15 years. During our study, water levels were lowest in [illegible], intermediate in [illegible], and highest in [illegible]. [illegible] water level in [illegible] left some primary habitats used by [illegible] *Hyla cinerea* dry and may have resulted in reduced [illegible] activity [illegible] lower recorded density. We also suspect that the impact of [illegible] on littoral zone vegetation, [illegible] *Limnobium spongia*, at [illegible] Pool [illegible] indirectly affected [illegible] calling activity in [illegible] were [illegible] lower than expected [illegible] [illegible] calling activity rather than an [illegible] density.

140. The decrease of alligators on Lake Conway is the result of human disturbance either through direct predation or by [illegible] nest sites through habitat destruction. Removal of [illegible], large female from the population may have a dramatic effect on the population in a pool for several years. The same is true when nesting areas, which were in very limited supply, were destroyed. Examples of both were recorded during the study. Mortality from boat traffic was documented but probably was of minor importance compared to the other factors.

141. Declines of turtles on Lake Conway were dramatic and confounded by several factors. Destruction of littoral zone habitat clearly affected turtle

densities in some areas of Lake Conway. More difficult to document, but certainly important to turtle populations, was the loss of suitable nesting sites around the lake. As the natural habitat was converted to residential development and much of the area planted in lawns, suitable nesting sites decreased. Whether conversion of some areas to white sand beach has countered the loss of natural nesting sites is unknown. It is known that turtles have a difficult time digging a nest hole in lawns. Our data clearly show that the major mortality factor for adult turtles on Lake Conway is the heavy boat traffic. Most adults of Pseudemys floridana have extensive scars from being hit by boat propellers. As boat traffic increases, so will this unnatural cause of mortality. We suspect that our use of Floy tags to mark Sternotherus odoratus also may have contributed to their decline. In some instances the Floy tags on individuals of S. odoratus became entangled in filamentous algae and resulted in the turtle drowning. At this time, we do not know the extent of the mortality implied by this observation but anticipate a thorough analysis of recapture data to evaluate its impact. Apparently, filamentous algae increased in Lake Conway during the study.

142. Turtles, probably more than any other group of amphibians or reptiles, are dependent on aquatic macrophyte productivity and most susceptible to its removal. Two common herbivorous species (Pseudemys floridana and P. nelsoni) are direct competitors with the white amur for aquatic plants and another species (Sternotherus odoratus) feeds primarily on snails that use the macrophytes as a substratum. We have documented pronounced shifts and reductions in density of these species in areas where the white amur has reduced or eliminated cover of particular plant species. Analyses indicate that P. floridana and S. odoratus have shifted their habitat use primarily from the littoral zone and Potamogeton beds to beds of Nitella, Vallisneria, and over bare bottoms as the composition of the aquatic macrophyte community changed from white amur feeding activity. These results are discussed in greater detail in Bancroft et al. ([illegible]).

143. Increased mortality had a dramatic effect on snake densities, particularly of Nerodia cyclopion. [illegible] of terrestrial sites for housing, particularly during the winter months, decimated the South Pool populations of N. cyclopion that were passing the colder season in burrows of

terrestrial mammals. This loss, combined with human predation in all pools and otter predation of trapped individuals in East and West Pools, accounted for the overall decrease in snake densities during the study.

144. In those situations where the white amur was shown to have contributed to the decline in population densities or changes in activity and habitat use by certain species, especially turtles, the low stocking rate, continual presence of aquatic macrophytes, and their subsequent increase in SY4 has ameliorated the long-term effects on the turtle and salamander populations in the lake. If additional stocking or an higher initial stocking rate had occurred, the long-term negative impact on some species of amphibians and reptiles would have been more severe. Under these conditions some species probably would have disappeared from the system.

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Table 1

Checklist of Amphibians and Reptiles Known from the Lake Conway System

Scientific Name	Common Name	Species Code*
AMPHIBIA		
CAUDATA		
AMPHIUMIDAE		
Amphiuma means	Two-toed amphiuma	A, [illegible]
PLETHODONTIDAE		
Eurycea quadridigitata	Dwarf salamander	
SIRENIDAE		
Pseudobranchus striatus	Dwarf siren	[illegible]
Siren lacertina	Greater siren	L
ANURA		
BUFONIDAE		
Bufo terrestris	Southern toad	F, [illegible]
HYLIDAE		
Acris gryllus	Florida cricket frog	Y, ★
Hyla cinerea	Green treefrog	H, $
Hyla femoralis	Pinewoods treefrog	M
Hyla squirella	Squirrel treefrog	P
MICROHYLIDAE		
Gastrophryne carolinensis	Eastern narrow-mouthed toad	G, 2
RANIDAE		
Rana grylio	Pig frog	R, +
Rana utricularia	Southern leopard frog	U, #, &

(Continued)

* If applicable, the code for adults of each species is followed by that for egg and larval stages. These codes are used in Figures 3 through 62.

Table 1 (Concluded)

REPTILIA		
CROCODILIA		
CROCODILIDAE		
Alligator mississippiensis	American alligator	E
TESTUDINATA		
CHELYDRIDAE		
Chelydra serpentina	Florida snapping turtle	O
EMYDIDAE		
Deirochelys reticularia	Chicken turtle	D
Pseudemys floridana	Peninsular cooter	F
Pseudemys nelsoni	Florida red-bellied turtle	C
*Pseudemys scripta***	Red-eared turtle	3
KINOSTERNIDAE		
Kinosternon baurii	Striped mud turtle	I
Kinosternon subrubrum	Eastern mud turtle	K
Sternotherus odoratus	Stinkpot	S, @
TRIONYCHIDAE		
Trionyx ferox	Florida softshell	T, 4
SQUAMATA		
COLUBRIDAE		
Coluber constrictor	Black racer	V
Farancia abacura	Mud snake	X
Nerodia cyclopion	Green water snake	N
Nerodia fasciata	Florida water snake	W
Regina alleni	Striped swamp snake	J
Thamnophis sauritus	Peninsula ribbon snake	Z
Thamnophis sirtalis	Eastern garter snake	Q

** Introduced species.

Table 2

Surface Area, Shoreline, Number of Species, and Number of Individuals Recorded from Each Pool and the Entire Lake Conway System During the Three-Year Study*

	South Pool	Middle Pool	East Pool	West Pool	Lake Gatlin	Lake Conway
Total pool						
Surface area, ha	142.6	301.0	128.4	144.4	26.6	743.0
Shoreline, km	5.58	10.73	9.78	5.25	3.33	34.67
Number of species	23	20	20	17	20	29
Number of individuals	3364	2084	2471	2146	1863	11928
Permanent sites						
Shoreline, m	530	200	200	370	470	[illegible]
Transect length						
HP, m	1060	800	400	740	940	3940
FT, m	460	200	490	370	200	1720
Time						
HP, hr	64.0	41.5	29.6	36.9	61.8	233.8
FT, days	3213	1359	2010	2255	1317	10154
Number of species	22	19	17	15	20	28
Number of individuals	1901	1309	1536	1621	1387	7754

* The transect lengths and sampling time for herp-patrol (HP) and funnel traps (FT) at each permanent site are shown. See Part III for additional explanation.

Table 3

Number of Individuals and Number of Species Recorded from All of South Pool and from the South Pool Permanent Site Only During Each Year of the Study

Study	Total Pool		Permanent Site	
Year	Individuals	Species	Individuals	Species
SY1	1396	21	1221	20
SY2	1019	21	381	20
SY3	949	17	299	14
Total	3364	[illegible]	1901	22

Table 4

Number of Individuals and Number of Species Recorded from All of Middle Pool and from the Middle Pool Permanent Site Only During Each Year of the Study

Study Year	Total Pool		Permanent Site	
	Individuals	Species	Individuals	Species
SY1	1212	19	755	18
SY2	446	16	248	14
SY3	424	16	306	11
Total	2084	20	1309	19

Table 5

Number of Individuals and Number of Species Recorded from All of East Pool and from the East Pool Permanent Site Only During Each Year of the Study

Study	Total Pool		Permanent Site	
Year	Individuals	Species	Individuals	Species
SY1	1352	17	800	15
SY2	480	14	304	13
SY3	639	17	432	15
Total	2471	20	1536	17

Table 6

Number of Individuals and Number of Species Recorded from All of West Pool and from the West Pool Permanent Site Only During Each Year of the Study

Study	Total Pool		Permanent Site	
Year	Individuals	Species	Individuals	Species
SY1	887	14	822	12
SY2	813	17	556	13
SY3	446	12	243	9
Total	2146	17	1621	15

Table 7

Number of Individuals and Number of Species Recorded from All of Lake Gatlin and from the Gatlin Canal Permanent Site Only During Each Year of the Study

Study	Total Pool		Permanent Site	
Year	Individuals	Species	Individuals	Species
SY1	948	19	585	18
SY2	497	19	389	19
SY3	418	16	413	16
Total	1863	20	1387	20

Table 8

Number of Individuals and Number of Species Recorded from All Pools and All Permanent Sites on Lake Conway During Each Year of the Study

Study	Total Pools		Permanent Sites	
Year	Individuals	Species	Individuals	Species
SY1	5795	27	4183	26
SY2	3257	24	1878	23
SY3	2876	21	1693	20
Total	11,928	29	7,754	28

Table 9

Density Responses of the Primary Herpetofaunal Groups on Lake Conway and the Major Causative Agents*

	Salamander	Frog	Alligator	Turtle	Snake
Density Response	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Causative agent					
Habitat loss	++	++	++	++	++
White amur	++	S		++	
Human predation			++		++
Boat mortality	+		+	++	
Water fluctuations	S	+	+	S	
Otter predation	+			S	+
Tag mortality	S			S	
Hurricane	S	S			
Trap shyness	S				

* ++ = major factor; + = minor factor; S = suspected factor.

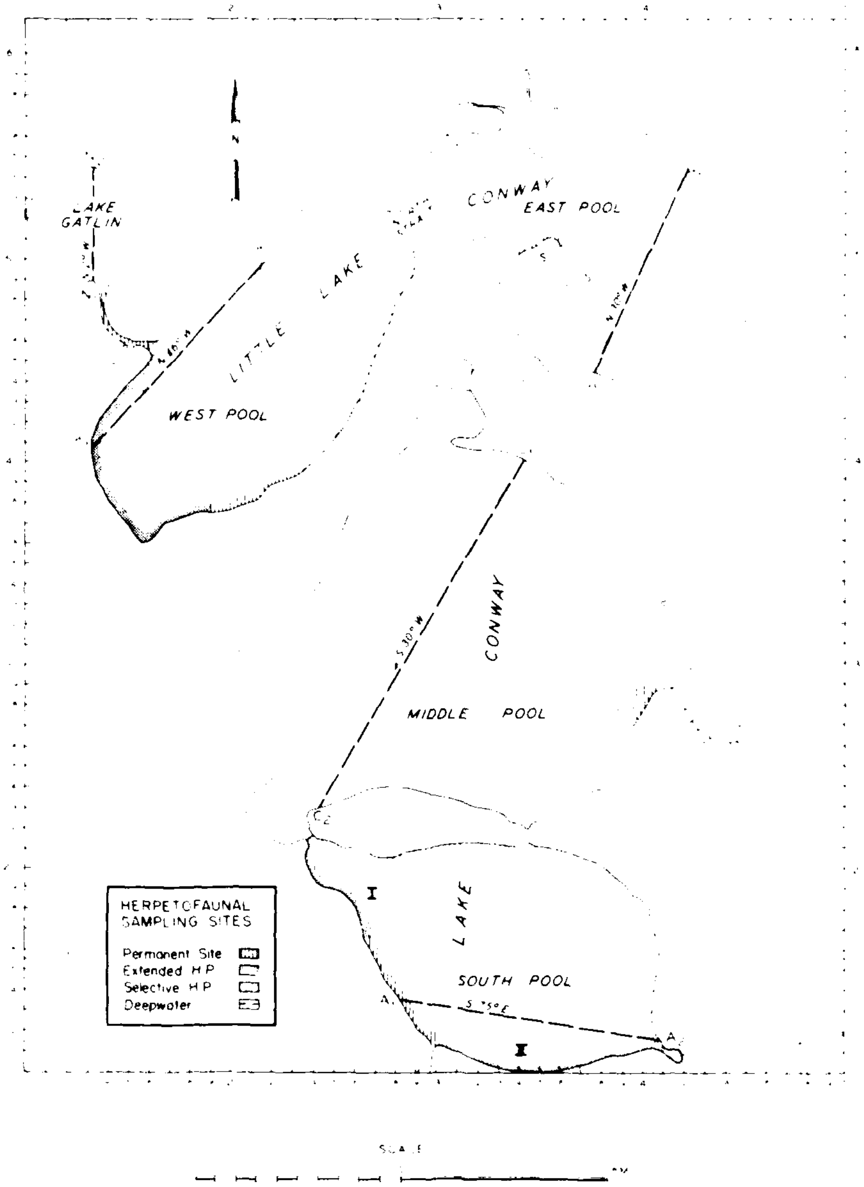

Figure 1. Map showing the five interconnected pools of Lake Conway and the permanent sampling sites for amphibians and reptiles.

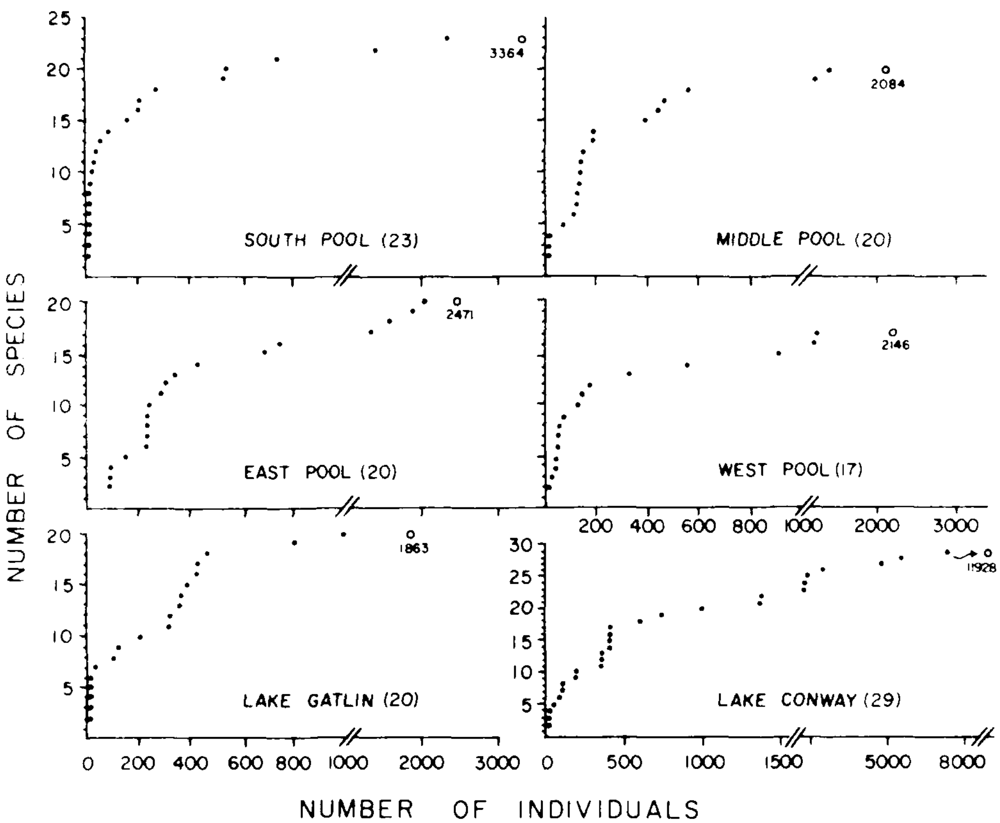

Figure 2. The cumulative number of amphibian and reptile species as a function of the cumulative number of individuals recorded for each pool and for the total of Lake Conway. Number in parentheses equals the number of species recorded. Circle indicates the last individual collected (and sample size) during the three-year study.

FREQUENCY BAR CHART

POINT	TRAPS		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
[illegible]	24	KKKKKKKKKKNNNNNNNNNNSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSXXXXXXXXXX	7	7	8.14	8.14
10	24	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAKKKKKKKKKKKKKKKKKKKKNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNSSSSSSSSSS	9	16	10.47	18.60
20	24	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAANNNNNNNNNNSSSSSSSSSS	7	23	8.14	26.74
30	24	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNNSSSSSSSSSSSSSSSSSSSS	5	28	5.81	32.56
40	24	NNNNNNNNNNNNNNNNNNNN	2	30	2.33	34.88
50	24	SSSSSSSSSSAAAAAAAAAA	2	32	2.33	37.21
60	24	KKKKKKKKKKKKKKKKKKKKKKKKKKKKKKNNNNNNNNNNSSSSSSSSSS	5	37	5.81	43.02
70	24	KKKKKKKKKKNNNNNNNNNN	2	39	2.33	45.35
80	24	KKKKKKKKKKNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN	4	43	4.65	50.00
90	24	KKKKKKKKKKNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNSSSSSSSSSS	5	48	5.81	55.81
100	24	KKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKTTTTTTTTTT	5	53	5.81	61.63
110	24		0	53	0.00	61.63
120	24		0	53	0.00	61.63
130	20	KKKKKKKKKK	1	54	1.16	62.79
140	20		0	54	0.00	62.79
150	[illegible]		0	54	[illegible]	62.79
160	20		[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	1	55	1.16	63.95
180	18	&&&&&&&&&&CCCCCCCCCC	2	57	2.33	66.28
190	18		0	57	0.00	66.28
200	18		0	57	0.00	66.28
210	18		0	57	0.00	66.28
220	18		0	57	0.00	66.28
230	18		0	57	0.00	66.28
240	18		0	57	0.00	66.28
250	19		0	57	0.00	66.28
260	19		0	57	0.00	66.28
270	19		0	57	0.00	66.28
280	19		0	57	0.00	66.28
290	19		0	57	0.00	66.28
300	19		0	57	0.00	66.28
310	19		0	57	0.00	66.28
320	19	NNNNNNNNNN	1	58	1.16	67.44
330	19		0	58	0.00	67.44
340	19	NNNNNNNNNNNNNNNNNNNN	2	60	2.33	69.77
350	19		0	60	0.00	69.77
360	19	AAAAAAAAAA	1	61	1.16	70.93
370	19	AAAAAAAAAAKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKK	5	66	5.81	76.74
380	18	NNNNNNNNNN	1	67	1.16	77.91
390	18		0	67	0.00	77.91
400	18		0	67	0.00	77.91
410	17	AAAAAAAAAAAAAAAAAAAA	2	69	2.33	80.23
420	15	AAAAAAAAAAKKKKKKKKKKKKKKKKKKKK	3	72	3.49	83.72
430	15	IIIIIIIIIINNNNNNNNNN	2	74	2.33	86.05
440	14	AAAAAAAAAAAAAAAAAAAAKKKKKKKKKK	3	77	3.49	89.53
450	14	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	3	80	3.49	93.02
460	14	AAAAAAAAAAAAAAAAAAAAKKKKKKKKKKKKKKKKKKKKKKKKKKKKKKSSSSSSSSSS	6	86	6.98	100.00

1 2 3 4 5 6 7 8 9

FREQUENCY

Figure 3. Funnel trap point analysis of amphibians and reptiles on the South Pool site during SY1. Point = location where traps were set; traps - total number of traps set at a sample point. See Table 1 for species codes for this and all subsequent figures.

FREQUENCY BAR CHART

```
POINT  TRAPS                                                                 FREQ   CUM.   PERCENT   CUM.
                                                                                    FREQ             PERCENT
                |
    0  23       |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS    3      3    17.65     17.65
   10  23       |AAAAAAAAAAAAAAAAAAAALLLLLLLLLLLLLLLLLLLL                        2      5    11.76     29.41
   20  23       |                                                                0      5     0.00     29.41
   30  23       |XXXXXXXXXXXXXXXXXXXX                                            1      6     5.88     35.29
   40  23       |                                                                0      6     0.00     35.29
   50  23       |                                                                0      6     0.00     35.29
   60  23       |                                                                0      6     0.00     35.29
   70  23       |                                                                0      6     0.00     35.29
   80  23       |                                                                0      6     0.00     35.29
   90  23       |                                                                0      6     0.00     35.29
  100  22       |                                                                0      6     0.00     35.29
  110  21       |                                                                0      6     0.00     35.29
  120  22       |33333333333333333333                                            1      7     5.88     41.18
  130  23       |                                                                0      7     0.00     41.18
  140  23       |                                                                0      7     0.00     41.18
  150  23       |LLLLLLLLLLLLLLLLLLLL                                            1      8     5.88     47.06
  160  23       |                                                                0      8     0.00     47.06
  170  23       |                                                                0      8     0.00     47.06
  180  23       |                                                                0      8     0.00     47.06
  190  23       |                                                                0      8     0.00     47.06
  200  23       |                                                                0      8     0.00     47.06
  210  23       |                                                                0      8     0.00     47.06
  220  23       |&&&&&&&&&&&&&&&&&&&&                                            1      9     5.88     52.94
  230  23       |                                                                0      9     0.00     52.94
  240  23       |                                                                0      9     0.00     52.94
  250  23       |                                                                0      9     0.00     52.94
  260  23       |                                                                0      9     0.00     52.94
  270  23       |                                                                0      9     0.00     52.94
  280  23       |                                                                0      9     0.00     52.94
  290  23       |&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&                        2     11    11.76     64.71
  300  23       |                                                                0     11     0.00     64.71
  310  22       |FFFFFFFFFFFFFFFFFFFF                                            1     12     5.88     70.59
  320  22       |                                                                0     12     0.00     70.59
  330  21       |                                                                0     12     0.00     70.59
  340  23       |&&&&&&&&&&&&&&&&&&&&NNNNNNNNNNNNNNNNNNNNAAAAAAAAAAAAAAAAAAAA    3     15    17.65     88.24
  350  23       |                                                                0     15     0.00     88.24
  360  23       |                                                                0     15     0.00     88.24
  370  23       |                                                                0     15     0.00     88.24
  380  22       |                                                                0     15     0.00     88.24
  390  23       |                                                                0     15     0.00     88.24
  400  23       |                                                                0     15     0.00     88.24
  410  23       |                                                                0     15     0.00     88.24
  420  23       |                                                                0     15     0.00     88.24
  430  23       |                                                                0     15     0.00     88.24
  440  23       |LLLLLLLLLLLLLLLLLLLL                                            1     16     5.88     94.12
  450  23       |                                                                0     16     0.00     94.12
  460  22       |JJJJJJJJJJJJJJJJJJJJ                                            1     17     5.88    100.00
                ---------------------+--------------------+--------------------+
                                     1                    2                    3

                                        FREQUENCY
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[illegible] amphibians and reptiles on the South Fork [illegible] location where traps were set; traps = total [illegible]

FREQUENCY BAR CHART

POINT	TRAPS	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	26	0	0	0.00	0.00
10	26	0	0	0.00	0.00
20	26	0	0	0.00	0.00
30	26	0	0	0.00	0.00
40	26	0	0	0.00	0.00
50	26	0	0	0.00	0.00
60	26	0	0	0.00	0.00
70	24	0	0	0.00	0.00
80	26	0	0	0.00	0.00
90	26	0	0	0.00	0.00
100	26	0	0	0.00	0.00
110	26	0	0	0.00	0.00
120	26	0	0	0.00	0.00
130	26	0	0	0.00	0.00
140	26	0	0	0.00	0.00
150	26	0	0	0.00	0.00
160	26	0	0	0.00	0.00
170	26	0	0	0.00	0.00
180	26	0	0	0.00	0.00
190	26	0	0	0.00	0.00
200	26	0	0	0.00	0.00
210	26	0	0	0.00	0.00
220	26	0	0	0.00	0.00
230	26	0	0	0.00	0.00
240	26	0	0	0.00	0.00
250	26	0	0	0.00	0.00
260	26	0	0	0.00	0.00
270	26	0	0	0.00	0.00
280	26	0	0	0.00	0.00
290	24	0	0	0.00	0.00
300	26	0	0	0.00	0.00
310	26	1	1	100.00	100.00
320	26	0	1	0.00	100.00
330	26	0	1	0.00	100.00
340	26	0	1	0.00	100.00
350	26	0	1	0.00	100.00
360	26	0	1	0.00	100.00
370	26	0	1	0.00	100.00
380	26	0	1	0.00	100.00
390	26	0	1	0.00	100.00
400	26	0	1	0.00	100.00
410	26	0	1	0.00	100.00
420	26	0	1	0.00	100.00
430	26	0	1	0.00	100.00
440	26	0	1	0.00	100.00
450	24	0	1	0.00	100.00
460	24	0	1	0.00	100.00

FREQUENCY

Figure 5. Funnel trap point analysis of amphibians and reptiles on the South Pond site during [illegible]. Point = location where traps were set; traps = total number of traps set at a sample point.

```
                                FREQUENCY BAR CHART

POINT                                                                    FREQ   CUM.   PERCENT   CUM.
                                                                                FREQ             PERCENT
       .
   0   |CFFFFFFFFFFFFFFFFFFFFFNNSSSSSSSSSSSSSSSSSSSSSSSS                  48     48    10.76     10.76
  10   |CFFFFSSSSSSSSSS                                                   15     63     3.36     14.13
  20   |FFFFSSSSSSSSS                                                     13     76     2.91     17.04
  30   |CFFFNSSSSSSTT                                                     13     89     2.91     19.96
  40   |CFFFF                                                              5     94     1.12     21.08
  50   |FFFKSST                                                            7    101     1.57     22.65
  60   |FFK                                                                3    104     0.67     23.32
  70   |ST                                                                 2    106     0.45     23.77
  80   |FF                                                                 2    108     0.45     24.22
  90   |FFFSSS                                                             6    114     1.35     25.56
 100   |FFFFSSSS                                                           8    122     1.79     27.35
 110   |FS                                                                 2    124     0.45     27.80
 120   |FSSS                                                               4    128     0.90     28.70
 130   |NSS                                                                3    131     0.67     29.37
 140   |FFIS                                                               4    135     0.90     30.27
 150   |CNSSSS                                                             6    141     1.35     31.61
 160   |KKS                                                                3    144     0.67     32.29
 170   |CFFSSS                                                             6    150     1.35     33.63
 180   |ST                                                                 2    152     0.45     34.08
 190   |NSSSS                                                              5    157     1.12     35.20
 200   |FNSSSSS                                                            7    164     1.57     36.77
 210   |S                                                                  1    165     0.22     37.00
 220   |KN                                                                 2    167     0.45     37.44
 230   |FSSS                                                               4    171     0.90     38.34
 240   |S                                                                  1    172     0.22     38.57
 250   |                                                                   0    172     0.00     38.57
 260   |NS                                                                 2    174     0.45     39.01
 270   |KSS                                                                3    177     0.67     39.69
 280   |NNS                                                                3    180     0.67     40.36
 290   |NNSSSST                                                            7    187     1.57     41.93
 300   |SS                                                                 2    189     0.45     42.38
 310   |SSSSSSS                                                            7    196     1.57     43.95
 320   |SS                                                                 2    198     0.45     44.39
 330   |NS                                                                 2    200     0.45     44.84
 340   |FFNSS                                                              5    205     1.12     45.96
 350   |CFSSSSSSS                                                          9    214     2.02     47.98
 360   |FKSS                                                               4    218     0.90     48.88
 370   |S                                                                  1    219     0.22     49.10
 380   |SSSS                                                               4    223     0.90     50.00
 390   |NNSSSS                                                             6    229     1.35     51.35
 400   |SS                                                                 2    231     0.45     51.79
 410   |SSSSSSSSSSSS                                                      12    243     2.69     54.48
 420   |NSSS                                                               4    247     0.90     55.38
 430   |CFFKSSSSSSSSSSSSSS                                                18    265     4.04     59.42
 440   |SSSSSSSSSSSSSS                                                    14    279     3.14     62.56
 450   |SSSSSSS                                                            7    286     1.57     64.13
 460   |NSSSS                                                              5    291     1.12     65.25
 470   |FFKSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS 65    356    14.57     79.82
 480   |FFFFFFFSSSSSSSSSSSSSSSSSSSSSSSS                                   31    387     6.95     86.77
 490   |CFFFSSSSSSSSSS                                                    14    401     3.14     89.91
 500   |FFFFFFNSSSSSSSSSSSSSSSSSSS                                        26    427     5.83     95.74
 510   |SSSSSS                                                             6    433     1.35     97.09
 520   |CFS                                                                3    436     0.67     97.76
 530   |CFFFFSSSST                                                        10    446     2.24    100.00
        -----+----+----+----+----+----+----+----+----+----+----+----+----+
             5   10   15   20   25   30   35   40   45   50   55   60   65

                              FREQUENCY
```

Figure 6. [illegible] point analysis [illegible] on the [illegible] Pool site during [illegible]. [illegible] transect.

```
                               FREQUENCY BAR CHART

POINT                                                                        FREQ  CUM.   PERCENT    CUM.
                                                                                   FREQ             PERCENT
       |
   0   |CCCCCSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS                               8     8      7.34       7.34
  10   |SSSSSSSSSSSSSSS                                                        3    11      2.75      10.09
  20   |SSSSS                                                                  1    12      0.92      11.01
  30   |                                                                       0    12      0.00      11.01
  40   |SSSSSSSSSS                                                             2    14      1.83      12.84
  50   |                                                                       0    14      0.00      12.84
  60   |SSSSS                                                                  1    15      0.92      13.76
  70   |                                                                       0    15      0.00      13.76
  80   |SSSSS                                                                  1    16      0.92      14.68
  90   |                                                                       0    16      0.00      14.68
 100   |FFFFFKKKKKSSSSS                                                        3    19      2.75      17.43
 110   |SSSSS                                                                  1    20      0.92      18.35
 120   |SSSSSSSSSSSSSSSSSSSS                                                   4    24      3.67      22.02
 130   |                                                                       0    24      0.00      22.02
 140   |                                                                       0    24      0.00      22.02
 150   |FFFFFSSSSSSSSSS                                                        3    27      2.75      24.77
 160   |                                                                       0    27      0.00      24.77
 170   |                                                                       0    27      0.00      24.77
 180   |SSSSSSSSSSSSSSS                                                        3    30      2.75      27.52
 190   |SSSSS                                                                  1    31      0.92      28.44
 200   |                                                                       0    31      0.00      28.44
 210   |                                                                       0    31      0.00      28.44
 220   |FFFFFKKKKK                                                             2    33      1.83      30.28
 230   |SSSSS                                                                  1    34      0.92      31.19
 240   |SSSSSSSSSS                                                             2    36      1.83      33.03
 250   |FFFFFFFFFFSSSSS                                                        3    39      2.75      35.78
 260   |SSSSSSSSSS                                                             2    41      1.83      37.61
 270   |SSSSS                                                                  1    42      0.92      38.53
 280   |SSSSSSSSSSSSSSSSSSSS                                                   4    46      3.67      42.20
 290   |                                                                       0    46      0.00      42.20
 300   |                                                                       0    46      0.00      42.20
 310   |                                                                       0    46      0.00      42.20
 320   |SSSSS                                                                  1    47      0.92      43.12
 330   |SSSSS                                                                  1    48      0.92      44.04
 340   |SSSSS                                                                  1    49      0.92      44.95
 350   |KKKKK                                                                  1    50      0.92      45.87
 360   |                                                                       0    50      0.00      45.87
 370   |                                                                       0    50      0.00      45.87
 380   |                                                                       0    50      0.00      45.87
 390   |SSSSSSSSSS                                                             2    52      1.83      47.71
 400   |SSSSS                                                                  1    53      0.92      48.62
 410   |SSSSSSSSSS                                                             2    55      1.83      50.46
 420   |SSSSSSSSSS                                                             2    57      1.83      52.29
 430   |SSSSS                                                                  1    58      0.92      53.21
 440   |SSSSSSSSSSSSSSS                                                        3    61      2.75      55.96
 450   |                                                                       0    61      0.00      55.96
 460   |LLLLLSSSSSSSSSS                                                        3    64      2.75      58.72
 470   |SSSSSSSSSS                                                             2    66      1.83      60.55
 480   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS                11    77     10.09      70.64
 490   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS           12    89     11.01      81.65
 500   |FFFFFFFFFFNNNNNSSSSSSSSSSSSSSS                                         6    95      5.50      87.16
 510   |SSSSSSSSSSSSSSSSSSSS                                                   4    99      3.67      90.83
 520   |SSSSSSSSSS                                                             2   101      1.83      92.66
 530   |LLLLLSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS                                8   109      7.34     100.00
       ----+----+----+----+----+----+----+----+----+----+----+----+
           1    2    3    4    5    6    7    8    9   10   11   12

                               FREQUENCY
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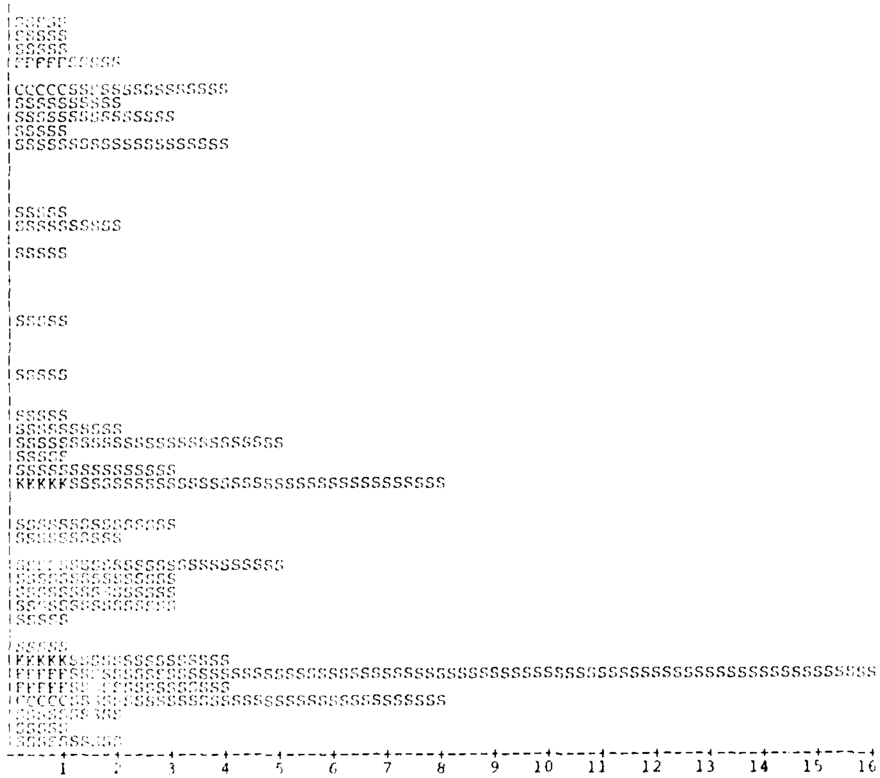
Figure 7. Herp-patrol point analysis of salamanders and reptiles on the South Pool site during SY2. Point = midpoint of 10-m section of herp-patrol transect.

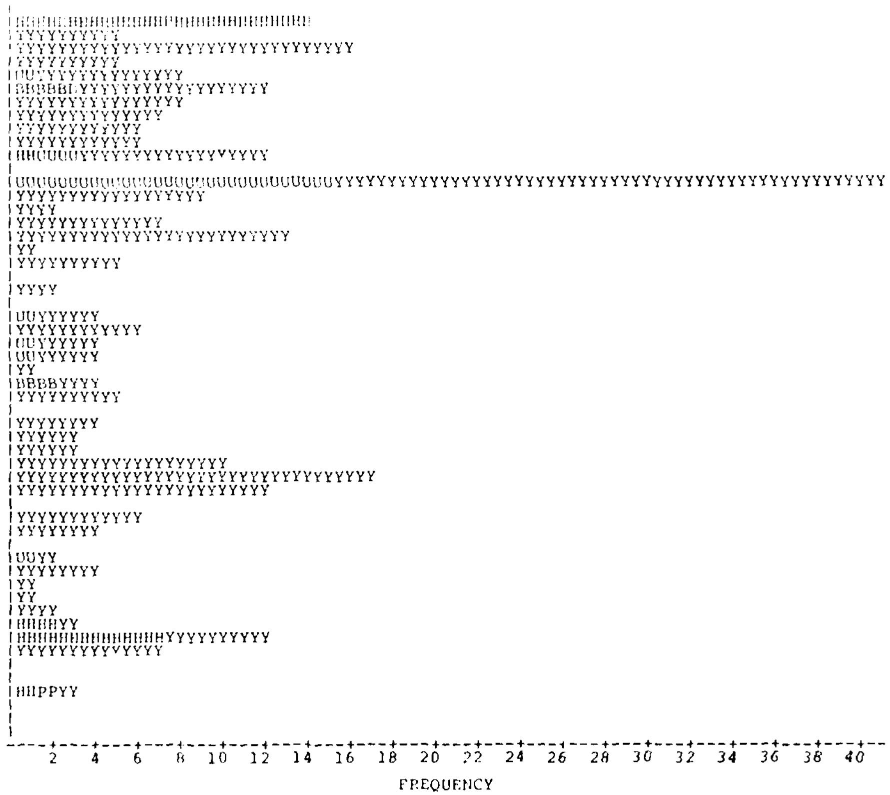
FREQUENCY BAR CHART



POINT	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	1	1	0.97	0.97
10	1	2	0.97	1.94
20	1	3	0.97	2.91
30	2	5	1.94	4.85
40	0	5	0.00	4.85
50	4	9	3.88	8.74
60	2	11	1.94	10.68
70	3	14	2.91	13.59
80	1	15	0.97	14.56
90	4	19	3.88	18.45
100	0	19	0.00	18.45
110	0	19	0.00	18.45
120	0	19	0.00	18.45
130	0	19	0.00	18.45
140	1	20	0.97	19.42
150	2	22	1.94	21.36
160	0	22	0.00	21.36
170	1	23	0.97	22.33
180	0	23	0.00	22.33
190	0	23	0.00	22.33
200	0	23	0.00	22.33
210	0	23	0.00	22.33
220	1	24	0.97	23.30
230	0	24	0.00	23.30
240	0	24	0.00	23.30
250	0	24	0.00	23.30
260	1	25	0.97	24.27
270	0	25	0.00	24.27
280	0	25	0.00	24.27
290	1	26	0.97	25.24
300	2	28	1.94	27.18
310	5	33	4.85	32.04
320	1	34	0.97	33.01
330	3	37	2.91	35.92
340	8	45	7.77	43.69
350	0	45	0.00	43.69
360	0	45	0.00	43.69
370	3	48	2.91	46.60
380	2	50	1.94	48.54
390	0	50	0.00	48.54
400	5	55	4.85	53.40
410	3	58	2.91	56.31
420	3	61	2.91	59.22
430	3	64	2.91	62.14
440	1	65	0.97	63.11
450	0	65	0.00	63.11
460	1	66	0.97	64.08
470	4	70	3.88	67.96
480	16	86	15.53	83.50
490	4	90	3.88	87.38
500	8	98	7.77	95.15
510	2	100	1.94	97.09
520	1	101	0.97	98.06
530	2	103	1.94	100.00

Figure 4. Herp-patrol point analysis of salamanders and reptiles on the [illegible] site during CY3. Point = midpoint of 10-m section of herp-patrol transect.

FREQUENCY BAR CHART



POINT	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	14	14	4.65	4.65
10	5	19	1.66	6.31
20	16	35	5.32	11.63
30	5	40	1.66	13.29
40	8	48	2.66	15.95
50	12	60	3.99	19.93
60	8	68	2.66	22.59
70	7	75	2.33	24.92
80	6	81	1.99	26.91
90	6	87	1.99	28.90
100	12	99	3.99	32.89
110	0	99	0.00	32.89
120	41	140	13.62	46.51
130	9	149	2.99	49.50
140	2	151	0.66	50.17
150	7	158	2.33	52.49
160	13	171	4.32	56.81
170	1	172	0.33	57.14
180	5	177	1.66	58.80
190	0	177	0.00	58.80
200	2	179	0.66	59.47
210	0	179	0.00	59.47
220	4	183	1.33	60.80
230	6	189	1.99	62.79
240	4	193	1.33	64.12
250	4	197	1.33	65.45
260	1	198	0.33	65.78
270	4	202	1.33	67.11
280	5	207	1.66	68.77
290	0	207	0.00	68.77
300	4	211	1.33	70.10
310	3	214	1.00	71.10
320	3	217	1.00	72.09
330	10	227	3.32	75.42
340	17	244	5.65	81.06
350	12	256	3.99	85.05
360	0	256	0.00	85.05
370	6	262	1.99	87.04
380	4	266	1.33	88.37
390	0	266	0.00	88.37
400	2	268	0.66	89.04
410	4	272	1.33	90.37
420	1	273	0.33	90.70
430	1	274	0.33	91.03
440	2	276	0.66	91.69
450	3	279	1.00	92.69
460	12	291	3.99	96.68
470	7	298	2.33	99.00
480	0	298	0.00	99.00
490	0	298	0.00	99.00
500	3	301	1.00	100.00
510	0	301	0.00	100.00
520	0	301	0.00	100.00
530	0	301	0.00	100.00

Figure 9. Herp-patrol point analysis of calling frogs on the South Pool site during SY1. Point = midpoint of 10-m section of herp-patrol transect.

FREQUENCY BAR CHART

POINT	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	10	10	5.13	5.13
10	9	19	4.62	9.74
20	1	20	0.51	10.26
30	3	23	1.54	11.79
40	3	26	1.54	13.33
50	5	31	2.56	15.90
60	4	35	2.05	17.95
70	9	44	4.62	22.56
80	6	50	3.08	25.64
90	7	57	3.59	29.23
100	8	65	4.10	33.33
110	5	70	2.56	35.90
120	3	73	1.54	37.44
130	2	75	1.03	38.46
140	4	79	2.05	40.51
150	10	89	5.13	45.64
160	6	95	3.08	48.72
170	2	97	1.03	49.74
180	1	98	0.51	50.26
190	4	102	2.05	52.31
200	7	109	3.59	55.90
210	1	110	0.51	56.41
220	4	114	2.05	58.46
230	3	117	1.54	60.00
240	1	118	0.51	60.51
250	4	122	2.05	62.56
260	2	124	1.03	63.59
270	1	125	0.51	64.10
280	4	129	2.05	66.15
290	4	133	2.05	68.21
300	2	135	1.03	69.23
310	4	139	2.05	71.28
320	2	141	1.03	72.31
330	2	143	1.03	73.33
340	2	145	1.03	74.36
350	4	149	2.05	76.41
360	6	155	3.08	79.49
370	2	157	1.03	80.51
380	1	158	0.51	81.03
390	0	158	0.00	81.03
400	2	160	1.03	82.05
410	3	163	1.54	83.59
420	6	169	3.08	86.67
430	3	172	1.54	88.21
440	1	173	0.51	88.72
450	6	179	3.08	91.79
460	12	191	6.15	97.95
470	1	192	0.51	98.46
480	0	192	0.00	98.46
490	0	192	0.00	98.46
500	3	195	1.54	100.00
510	0	195	0.00	100.00
520	0	195	0.00	100.00
530	0	195	0.00	100.00

Figure 19. Herp-patrol point analysis of calling frogs on the South Pool site during SY2. Point - midpoint of 10-m section of herp-patrol transect.

FREQUENCY BAR CHART

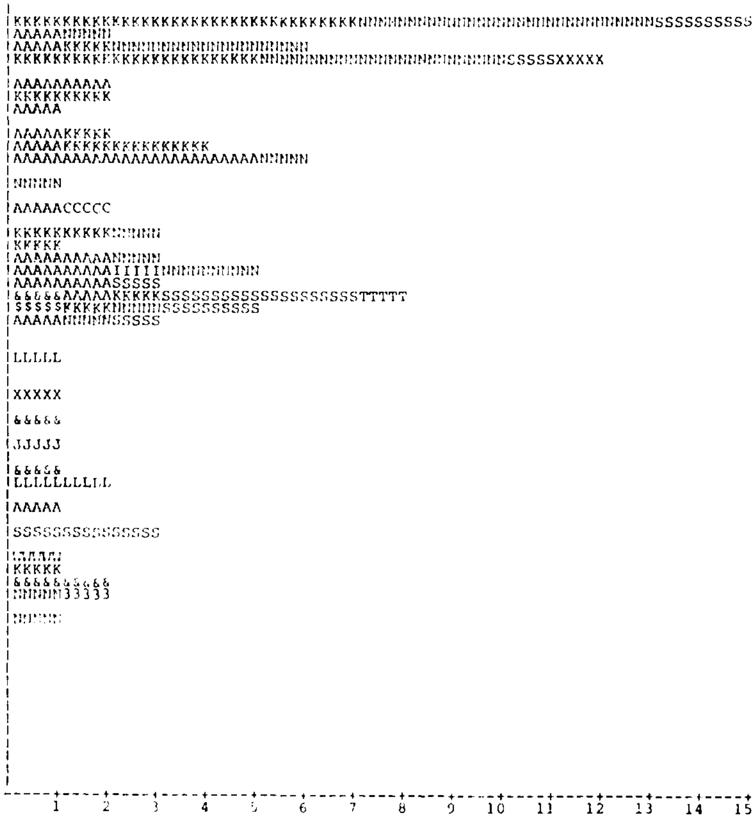
POINT		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0		0	0	0.00	0.00
10		0	0	0.00	0.00
20		0	0	0.00	0.00
30		0	0	0.00	0.00
40		0	0	0.00	0.00
50		0	0	0.00	0.00
60		0	0	0.00	0.00
70		0	0	0.00	0.00
80		0	0	0.00	0.00
90		0	0	0.00	0.00
100	UUYYYYYYYYYYYYYY	8	8	5.06	5.06
110	UUYYYYYYYYYYYYYYYY	9	17	5.70	10.76
120	UUUUYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY	18	35	11.39	22.15
130	UUYYYYYYYYYYYYYYYYYYYY	11	46	6.96	29.11
140	YYYYYY	3	49	1.90	31.01
150		0	49	0.00	31.01
160		0	49	0.00	31.01
170		0	49	0.00	31.01
180		0	49	0.00	31.01
190		0	49	0.00	31.01
200	YYYYYYYY	4	53	2.53	33.54
210	UUYYYYYYYY	5	58	3.16	36.71
220	YYYYYYYYYY	5	63	3.16	39.87
230	YYYYYYYYYYYY	6	69	3.80	43.67
240	YYYYYYYYYYYYYYYY	8	77	5.06	48.73
250	YYYY	2	79	1.27	50.00
260		0	79	0.00	50.00
270		0	79	0.00	50.00
280		0	79	0.00	50.00
290		0	79	0.00	50.00
300	YY	1	80	0.63	50.63
310	UUYYYYYY	4	84	2.53	53.16
320	UUYY	2	86	1.27	54.43
330	HHYYYYYYYYYYYYYY	8	94	5.06	59.49
340	UUYYYYYYYYYYYYYYYYYYYYYY	12	106	7.59	67.09
350	HHHHUUYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYYY	23	129	14.56	81.65
360	GGYYYYYYYYYYYY	7	136	4.43	86.08
370	UUYY	2	138	1.27	87.34
380		0	138	0.00	87.34
390		0	138	0.00	87.34
400		0	138	0.00	87.34
410	HHYY	2	140	1.27	88.61
420	BB	1	141	0.63	89.24
430	HH	1	142	0.63	89.87
440	HHYYYYYYYYYY	6	148	3.80	93.67
450	HHHHYYYY	4	152	2.53	96.20
460	UU	1	153	0.63	96.84
470	YY	1	154	0.63	97.47
480	BB	1	155	0.63	98.10
490		0	155	0.00	98.10
500		0	155	0.00	98.10
510	UUUU	2	157	1.27	99.37
520	UU	1	158	0.63	100.00
530		0	158	0.00	100.00

2 4 6 8 10 12 14 16 18 20 22

FREQUENCY

Figure 11. Herp-patrol point analysis of calling frogs on the South Pool site during SY3. Point = midpoint of 10-m section of herp-patrol transect.

FREQUENCY BAR CHART



TRIP	TRAPS	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
21 JUL 77	13	15	15	14.42	14.42
18 AUG 77	13	2	17	1.92	16.35
26 AUG 77	13	6	23	5.77	22.12
24 SEP 77	13	12	35	11.54	33.65
13 OCT 77	13	0	35	0.00	33.65
17 NOV 77	18	2	37	1.92	35.58
15 DEC 77	18	2	39	1.92	37.50
13 JAN 78	44	1	40	0.96	38.46
29 JAN 78	44	0	40	0.00	38.46
14 FEB 78	42	2	42	1.92	40.38
28 FEB 78	42	4	46	3.85	44.23
21 MAR 78	47	6	52	5.77	50.00
28 MAR 78	47	0	52	0.00	50.00
11 APR 78	47	1	53	0.96	50.96
25 APR 78	46	0	53	0.00	50.96
5 MAY 78	47	2	55	1.92	52.88
22 MAY 78	47	0	55	0.00	52.88
20 JUN 78	47	3	58	2.88	55.77
28 JUN 78	47	1	59	0.96	56.73
11 JUL 78	47	3	62	2.88	59.62
28 JUL 78	47	5	67	4.81	64.42
16 AUG 78	47	3	70	2.88	67.31
31 AUG 78	47	8	78	7.69	75.00
14 SEP 78	47	5	83	4.81	79.81
30 SEP 78	47	3	86	2.88	82.69
15 OCT 78	47	0	86	0.00	82.69
03 NOV 78	47	0	86	0.00	82.69
18 NOV 78	47	1	87	0.96	83.65
01 DEC 78	47	0	87	0.00	83.65
16 DEC 78	46	0	87	0.00	83.65
13 JAN 79	47	1	88	0.96	84.62
20 JAN 79	47	0	88	0.00	84.62
03 FEB 79	46	1	89	0.96	85.58
18 FEB 79	47	0	89	0.00	85.58
03 MAR 79	46	1	90	0.96	86.54
15 MAR 79	46	0	90	0.00	86.54
07 APR 79	47	1	91	0.96	87.50
21 APR 79	47	2	93	1.92	89.42
12 MAY 79	46	0	93	0.00	89.42
26 MAY 70	47	1	94	0.96	90.38
13 JUN 79	47	0	94	0.00	90.38
26 JUN 79	47	3	97	2.88	93.27
11 JUL 79	47	0	97	0.00	93.27
24 JUL 79	47	1	98	0.96	94.23
22 AUG 79	46	1	99	0.96	95.19
29 AUG 79	47	2	101	1.92	97.12
13 SEP 79	45	2	103	1.92	99.04
25 SEP 79	45	0	103	0.00	99.04
14 OCT 79	90	1	104	0.96	100.00
20 OCT [illegible]	90	0	104	0.00	100.00
07 NOV 79	92	[illegible]	[illegible]	[illegible]	100.00
06 DEC 79	92	0	104	0.00	100.00
12 JAN 80	92	0	104	0.00	100.00
02 FEB 80	92	0	104	0.00	100.00
23 FEB 80	92	0	104	0.00	100.00
22 MAR 80	92	0	104	0.00	100.00
26 APR 80	92	0	104	0.00	100.00
31 MAY 80	92	0	104	0.00	100.00
28 JUN 80	92	0	104	0.00	100.00
25 JUL 80	88	0	104	0.00	100.00
29 AUG 80	92	0	104	0.00	100.00
17 SEP 80	92	0	104	0.00	100.00

Figure 12. Funnel trap trip analysis of amphibians and reptiles on the South Pool site. Trip = date of trapping; traps = total number of traps set on a date.

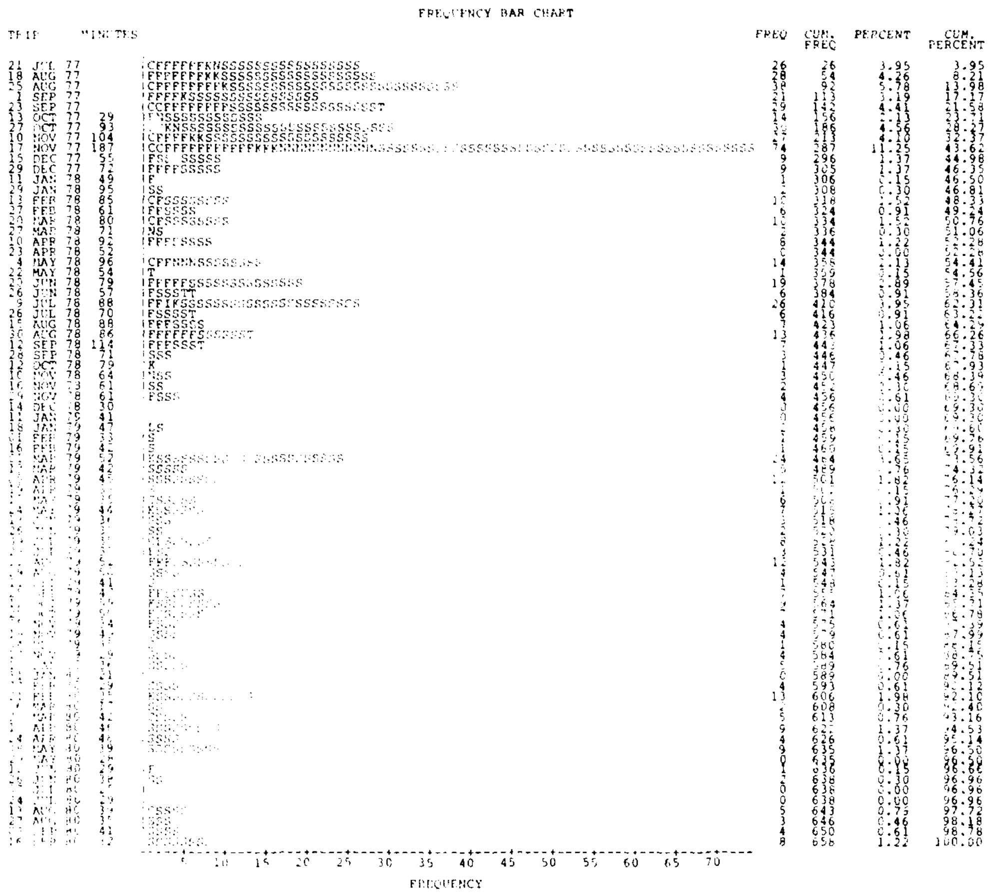


Figure 13. Herp-patrol trip analysis of salamanders and reptiles on the South Pool site. Trip = date of herp-patrol; minutes = total sampling time of a herp-patrol on a date (time not recorded prior to 13 October 1977).

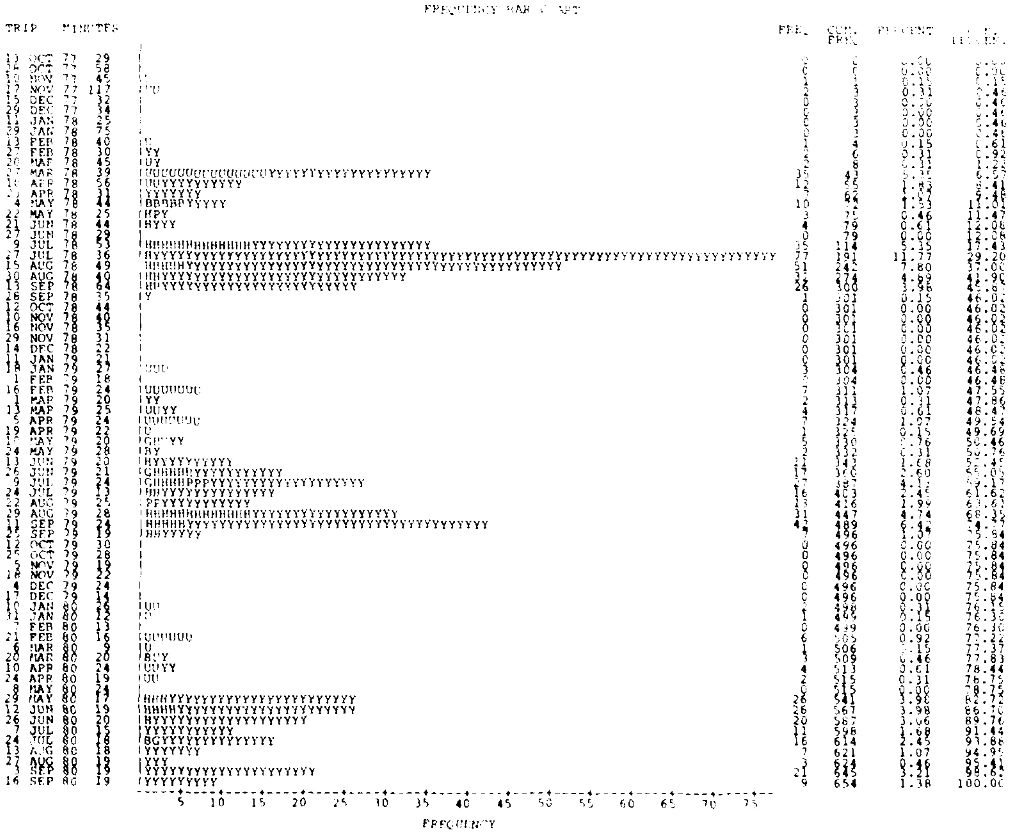
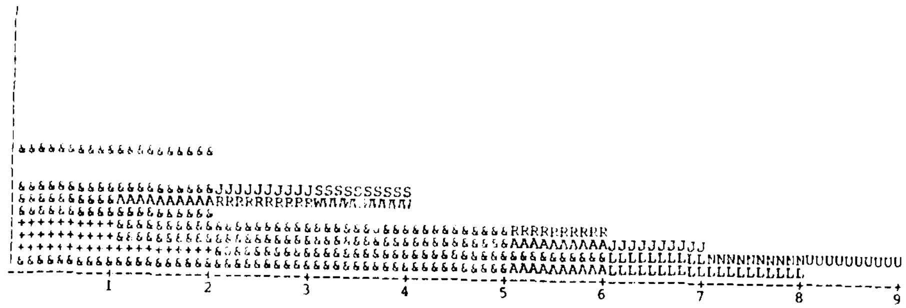


Figure 14. Herp-patrol trip analysis of calling frogs on the South Pool site. Trip = date of herp-patrol; minutes = total sampling time of a herp-patrol on a date (time not recorded prior to 13 October 1977).

```
                                FREQUENCY BAR CHART
POINT  TRAPS                                                        FREQ  CUM.  PERCENT   CUM.
                                                                          FREQ           PERCENT
            |
 1000  21   |KKKKK                                                    1     1    2.04      2.04
 1010  21   |NNNNNSSSSS                                               2     3    4.08      6.12
 1020  22   |KKKKKSSSSS                                               2     5    4.08     10.20
 1030  22   |                                                         0     5    0.00     10.20
 1040  24   |&&&&&                                                    1     6    2.04     12.24
 1050  24   |                                                         0     6    0.00     12.24
 1060  24   |                                                         0     6    0.00     12.24
 1070  24   |                                                         0     6    0.00     12.24
 1080  24   |                                                         0     6    0.00     12.24
 1090  24   |+++++LLLLL                                               2     8    4.08     16.33
 1100  24   |AAAAALLLLLNNNNN                                          3    11    6.12     22.45
 1110  24   |AAAAALLLLL                                               2    13    4.08     26.53
 1120  24   |&&&&&&&&&&AAAAAAAAAA                                     4    17    8.16     34.69
 1130  24   |+++++&&&&&LLLLLNNNNNNNNNNSSSSS                           6    23   12.24     46.94
 1140  16   |++++++++++&&&&&AAAAAAAAAAAAAAAAAAAAAAAAALLLLLRRRRR      10    33   20.41     67.35
 1150  16   |LLLLLNNNNN                                               2    35    4.08     71.43
 1160  16   |AAAAALLLLLNNNNNRRRRR                                     4    39    8.16     79.59
 1170  16   |AAAAALLLLL                                               2    41    4.08     83.67
 1180  16   |*****AAAAAAAAAAFFFFFLLLLLLLLLLLLLLLNNNNN                 8    49   16.33    100.00
 1190  16
            -----+----+----+----+----+----+----+----+----+----+
                 1    2    3    4    5    6    7    8    9   10
                               FREQUENCY
```

Figure 15. Funnel trap point analysis of amphibians and reptiles on the Middle Pool site during SY1. Point = location where traps were set; traps = total number of traps set at a sample point.

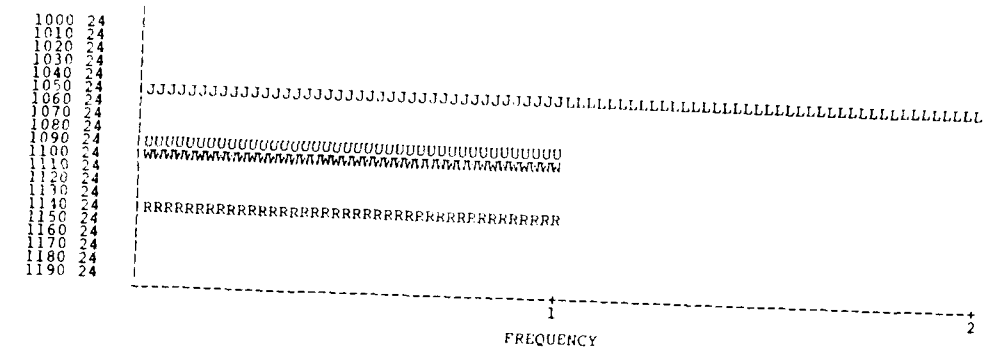
FREQUENCY BAR CHART



POINT	TRAPS	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
1000	23	0	0	0.00	0.00
1010	23	0	0	0.00	0.00
1020	23	0	0	0.00	0.00
1030	23	0	0	0.00	0.00
1040	23	0	0	0.00	0.00
1050	23	0	0	0.00	0.00
1060	22	0	0	0.00	0.00
1070	22	0	0	0.00	0.00
1080	23	0	0	0.00	0.00
1090	23	0	0	0.00	0.00
1100	23	2	2	4.76	4.76
1110	23	0	2	0.00	4.76
1120	22	0	2	0.00	4.76
1130	23	4	6	9.52	14.29
1140	23	4	10	9.52	23.81
1150	23	2	12	4.76	28.57
1160	23	6	18	14.29	42.86
1170	23	7	25	16.67	[illegible]
1180	23	9	34	21.43	80.95
1190	23	8	42	19.05	100.00

Figure 16. Funnel trap point analysis of amphibians and reptiles on the Middle Pool site during SY2. Point = location where traps were set; traps = total number of traps set at a sample point.

FREQUENCY BAR CHART



POINT	TRAPS	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
1000	24	0	0	0.00	0.00
1010	24	0	0	0.00	0.00
1020	24	0	0	0.00	0.00
1030	24	0	0	0.00	0.00
1040	24	0	0	0.00	0.00
1050	24	2	2	40.00	40.00
1060	24	0	2	0.00	40.00
1070	24	0	2	0.00	40.00
1080	24	0	2	0.00	40.00
1090	24	1	3	20.00	60.00
1100	24	1	4	20.00	80.00
1110	24	0	4	0.00	80.00
1120	24	0	4	0.00	80.00
1130	24	0	4	0.00	80.00
1140	24	1	5	20.00	100.00
1150	24	0	5	0.00	100.00
1160	24	0	5	0.00	100.00
1170	24	0	5	0.00	100.00
1180	24	0	5	0.00	100.00
1190	24	0	5	0.00	100.00

Figure 17. Funnel trap point analysis of amphibians and reptiles on the Middle Pool site during SY3. Point = location where traps were set; traps = total number of traps set at a sample point.

FREQUENCY BAR CHART

```
POINT
         |
 2000    |EEEEEEEE
 2010    |SSSSSSSS
 2020    |CCSSSSSSSSSS
 2030    |SSSSSSSSSS
 2040    |LLSSSSSSSSSSSS
 2050    |CCSSSSSS
 2060    |CCCCFFSSSSSSSSSSSSSSSSSSSSSSSS
 2070    |CCFFFFFFFFSSSSSSSSSSSSSSSSSS
 2080    |FFIISSSSSSSSSSSS
 2090    |FFSSSSSSSSSS
 2100    |SSSSSSSS
 2110    |FFSSSSSSSSSSSSWW
 2120    |CCSSSSSSSS
 2130    |FFFFFFFFSSSSSS
 2140    |CCSSSSSSSS
 2150    |SSSSSSSSSSSSSSSS
 2160    |FFFFSSSS
 2170    |FFSSSSSS
 2180    |SS
 2190    |
 2200    |
 3000    |SSSSSSSSSSSS
 3010    |NNSSSSSSSS
 3020    |NNSSSSSSSSSSSSSSSS
 3030    |SSSSSSSSSSSSSSSSSSSS
 3040    |FF
 3050    |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3060    |FFSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3070    |FFFFSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3080    |FFSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3090    |FFFFSSSSSSSS
 3100    |
 3110    |NNSSSSSSSSSSSSSSSSTT
 3120    |SS
 3130    |FFSS
 3140    |FFFFSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS
 3150    |FFFFFFSSSSSSSSSSSSSSSSSSSSSS
 3160    |SSSSSS
 3170    |SSSSSSSSSSSSSSSSSSSSSS
 3180    |SSSS
 3190    |
 3200    |
          ----+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+--
              2   4   6   8  10  12  14  16  18  20  22  24  26  28  30  32  34  36  38  40  42  44
                                              FREQUENCY
```

POINT	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
2000	4	4	1.20	1.20
2010	4	8	1.20	2.41
2020	6	14	1.81	4.22
2030	5	19	1.51	5.72
2040	7	26	2.11	7.83
2050	4	30	1.20	9.04
2060	15	45	4.52	13.55
2070	14	59	4.22	17.77
2080	8	67	2.41	20.18
2090	6	73	1.81	21.99
2100	4	77	1.20	23.19
2110	8	85	2.41	25.60
2120	5	90	1.51	27.11
2130	7	97	2.11	29.22
2140	5	102	1.51	30.72
2150	8	110	2.41	33.13
2160	4	114	1.20	34.34
2170	4	118	1.20	35.54
2180	1	119	0.30	35.84
2190	0	119	0.00	35.84
2200	0	119	0.00	35.84
3000	6	125	1.81	37.65
3010	5	130	1.51	39.16
3020	9	139	2.71	41.87
3030	10	149	3.01	44.88
3040	1	150	0.30	45.18
3050	25	175	7.53	52.71
3060	24	199	7.23	59.94
3070	45	244	13.55	73.49
3080	16	260	4.82	78.31
3090	6	266	1.81	80.12
3100	0	266	0.00	80.12
3110	10	276	3.01	83.13
3120	1	277	0.30	83.43
3130	2	279	0.60	84.04
3140	23	302	6.93	90.96
3150	14	316	4.22	95.18
3160	3	319	0.90	96.08
3170	11	330	3.31	99.40
3180	2	332	0.60	100.00
3190	0	332	0.00	100.00
3200	0	332	0.00	100.00

Figure [illegible]. Herp-patrol point analysis of salamanders and reptiles on the Middle Road site (2000 and 3000 series) during [illegible]. Point = midpoint of 10-m section of herp-patrol transect.

FREQUENCY BAR CHART

```
POINT                                                                FREQ   CUM.   PERCENT    CUM.
                                                                            FREQ              PERCENT
      |
 2000 |EEEEESSSSSSSSSS                                                  3      3     4.35      4.35
 2010 |SSSSS                                                            1      4     1.45      5.80
 2020 |                                                                 0      4     0.00      5.80
 2030 |                                                                 0      4     0.00      5.80
 2040 |                                                                 0      4     0.00      5.80
 2050 |                                                                 0      4     0.00      5.80
 2060 |SSSSS                                                            1      5     1.45      7.25
 2070 |                                                                 0      5     0.00      7.25
 2080 |                                                                 0      5     0.00      7.25
 2090 |                                                                 0      5     0.00      7.25
 2100 |                                                                 0      5     0.00      7.25
 2110 |                                                                 0      5     0.00      7.25
 2120 |                                                                 0      5     0.00      7.25
 2130 |SSSSSSSSSS                                                       2      7     2.90     10.14
 2140 |SSSSS                                                            1      8     1.45     11.59
 2150 |CCCCCSSSSS                                                       2     10     2.90     14.49
 2160 |SSSSSSSSSS                                                       2     12     2.90     17.39
 2170 |                                                                 0     12     0.00     17.39
 2180 |                                                                 0     12     0.00     17.39
 2190 |                                                                 0     12     0.00     17.39
 2200 |                                                                 0     12     0.00     17.39
 3000 |SSSSSSSSSSSSSSSSSSSS                                             4     16     5.80     23.19
 3010 |                                                                 0     16     0.00     23.19
 3020 |SSSSS                                                            1     17     1.45     24.64
 3030 |SSSSSSSSSSSSSSS                                                  3     20     4.35     28.99
 3040 |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS                    9     29    13.04     42.03
 3050 |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS                              7     36    10.14     52.17
 3060 |SSSSSSSSSSSSSSS                                                  3     39     4.35     56.52
 3070 |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS              10     49    14.49     71.01
 3080 |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSS                                   6     55     8.70     79.71
 3090 |                                                                 0     55     0.00     79.71
 3100 |SSSSS                                                            1     56     1.45     81.16
 3110 |                                                                 0     56     0.00     81.16
 3120 |SSSSS                                                            1     57     1.45     82.61
 3130 |                                                                 0     57     0.00     82.61
 3140 |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS                              7     64    10.14     92.75
 3150 |SSSSSSSSSSSSSSS                                                  3     67     4.35     97.10
 [illegible] |SSSSS                                                     1     68     1.45     98.55
 [illegible] |                                                          0     68     0.00     98.55
 [illegible] |                                                          0     68     0.00     98.55
 [illegible] |SSSSS                                                     1     69     1.45    100.00
 [illegible] |                                                          0     69     0.00    100.00
      -----+----+----+----+----+----+----+----+----+----+
           1    2    3    4    5    6    7    8    9   10

                          FREQUENCY
```

[illegible] Herp-patrol point analysis of salamanders and reptiles on the Middle Pond [illegible] (2000 and 3000 series) during [illegible]. Point = midpoint of [illegible] section [illegible] herp-patrol transect.

AD-A134 341 AQUATIC PLANT CONTROL RESEARCH PROGRAM LARGE-SCALE OPERATIONS MANAGEMENT..(U) UNIVERSITY OF SOUTH FLORIDA TAMPA DEPT OF BIOLOGY R W MCDIARMID ET AL. JUL 83 WES-A-78-2-2-3-VOL-5 DACW39-76-C-0047 F/G 6/3 NL

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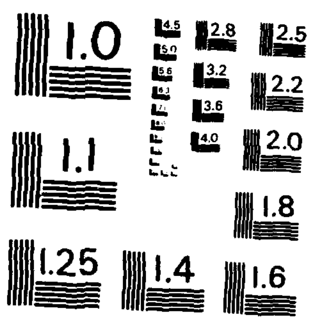


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

```
                                      FREQUENCY BAR CHART

POINT                                                                             FREQ   CUM.    PERCENT     CUM.
                                                                                         FREQ               PERCENT
       |
2000   |SSSSS                                                                        1      1     1.45       1.45
2010   |                                                                             0      1     0.00       1.45
2020   |                                                                             0      1     0.00       1.45
2030   |SSSSS                                                                        1      2     1.45       2.90
2040   |                                                                             0      2     0.00       2.90
2050   |                                                                             0      2     0.00       2.90
2060   |FFFFF                                                                        1      3     1.45       4.35
2070   |SSSSSSSSSSSSSSSSSSSS                                                         4      7     5.80      10.14
2080   |SSSSSSSSSS                                                                   2      9     2.90      13.04
2090   |SSSSSSSSSS                                                                   2     11     2.90      15.94
2100   |                                                                             0     11     0.00      15.94
2110   |                                                                             0     11     0.00      15.94
2120   |                                                                             0     11     0.00      15.94
2130   |SSSSS                                                                        1     12     1.45      17.39
2140   |                                                                             0     12     0.00      17.39
2150   |SSSSSSSSSS                                                                   2     14     2.90      20.29
2160   |SSSSS                                                                        1     15     1.45      21.74
2170   |                                                                             0     15     0.00      21.74
2180   |SSSSS                                                                        1     16     1.45      23.19
2190   |SSSSSSSSSSSSSSS                                                              3     19     4.35      27.54
2200   |                                                                             0     19     0.00      27.54
3000   |                                                                             0     19     0.00      27.54
3010   |SSSSS                                                                        1     20     1.45      28.99
3020   |SSSSSSSSSS                                                                   2     22     2.90      31.88
3030   |SSSSS                                                                        1     23     1.45      33.33
3040   |SSSSSSSSSSSSSSS                                                              3     26     4.35      37.68
3050   |SSSSSSSSSS                                                                   2     28     2.90      40.58
3060   |LLLLLSSSSS                                                                   2     30     2.90      43.48
3070   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS                12     42    17.39      60.87
3080   |FFFFFFFFFFSSSSSSSSSSSSSSSSSSSSSSSSS                                          7     49    10.14      71.01
3090   |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS                                          7     56    10.14      81.16
3100   |SSSSSSSSSS                                                                   2     58     2.90      84.06
3110   |SSSSS                                                                        1     59     1.45      85.51
3120   |SSSSS                                                                        1     60     1.45      86.96
3130   |SSSSS                                                                        1     61     1.45      88.41
3140   |SSSSSSSSSSSSSSS                                                              3     64     4.35      92.75
3150   |SSSSSSSSSSSSSSSSSSSS                                                         4     68     5.80      98.55
3160   |                                                                             0     68     0.00      98.55
3170   |SSSSS                                                                        1     69     1.45     100.00
3180   |                                                                             0     69     0.00     100.00
3190   |                                                                             0     69     0.00     100.00
3200   |                                                                             0     69     0.00     100.00
        ----+----+----+----+----+----+----+----+----+----+----+----+
            1    2    3    4    5    6    7    8    9   10   11   12

                                   FREQUENCY
```

Figure 20. Herp-patrol point analysis of salamanders and reptiles on the Middle Pool site (2000 and 3000 series) during SY3. Point = midpoint of 10-m section of herp-patrol transect.

```
                              FREQUENCY BAR CHART

POINT                                                            FREQ  CUM.  PERCENT   CUM.
                                                                       FREQ          PERCENT
      |
1000  |                                                             0     0    0.00     0.00
1010  |HHHHHRUYYY                                                  18    18    6.72     6.72
1020  |HHHRUUYY                                                    15    33    5.60    12.31
1030  |                                                             0    33    0.00    12.31
1040  |Y                                                            1    34    0.37    12.69
1050  |                                                             0    34    0.00    12.69
1060  |YY                                                           4    38    1.49    14.18
1070  |HHHHHRYYYY                                                  19    57    7.09    21.27
1080  |U                                                            2    59    0.75    22.01
1090  |                                                             0    59    0.00    22.01
1100  |BBB                                                          5    64    1.87    23.88
1110  |RRRUUYYY                                                    14    78    5.22    29.10
1120  |YY                                                           4    82    1.49    30.60
1130  |RRUY                                                         6    88    2.24    32.84
1140  |HRUYYY                                                      10    98    3.73    36.57
1150  |GGHHHRYYYY                                                  18   116    6.72    43.28
1160  |RYYY                                                         8   124    2.99    46.27
1170  |GHHRYYY                                                     12   136    4.48    50.75
1180  |YYY                                                          6   142    2.24    52.99
1190  |HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHRRYYYYYYYYYYYYYYYYY 126   268   47.01   100.00
      -----+----+----+----+----+----+----+----+----+----+----+----+---
          10   20   30   40   50   60   70   80   90  100  110  120

                                  FREQUENCY
```

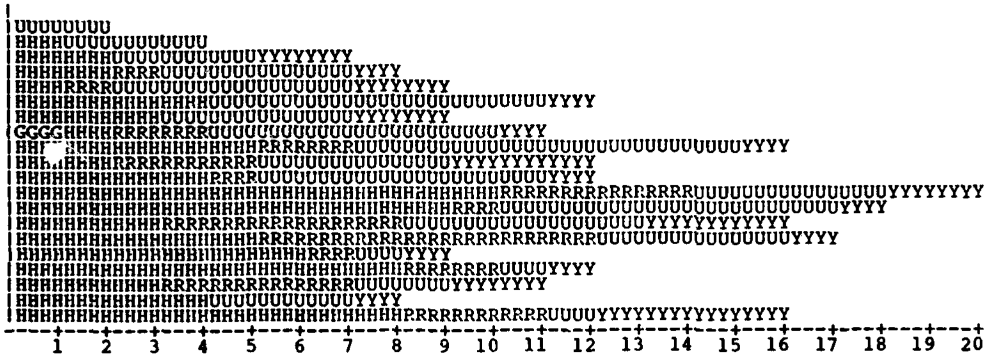
Figure 21. Herp-patrol point analysis of calling frogs on the Middle Pool site during SY1. Point = midpoint of 10-m section of herp-patrol transect.

```
                                                FREQUENCY BAR CHART
POINT                                                                                       FREQ  CUM.   PERCENT    CUM.
                                                                                                  FREQ             PERCENT
      |
1000  |YYYYYY                                                                                  3     3     2.40      2.40
1010  |YYYY                                                                                    2     5     1.60      4.00
1020  |YYYYYYYYYY                                                                              5    10     4.00      8.00
1030  |YYYY                                                                                    2    12     1.60      9.60
1040  |YYYYYYYYYY                                                                              5    17     4.00     13.60
1050  |HHHHUUYYYYYYYYYY                                                                        8    25     6.40     20.00
1060  |YYYYYYYY                                                                                4    29     3.20     23.20
1070  |YYYY                                                                                    2    31     1.60     24.80
1080  |UUYY                                                                                    2    33     1.60     26.40
1090  |YYYY                                                                                    2    35     1.60     28.00
1100  |HHHHYY                                                                                  3    38     2.40     30.40
1110  |YYYY                                                                                    2    40     1.60     32.00
1120  |HHHHHHRRUUUUUUUUUU                                                                      9    49     7.20     39.20
1130  |HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHRRRRUUUUUU                   34    83    27.20     66.40
1140  |HHHHHHHHHHRRUUUUUU                                                                      9    92     7.20     73.60
1150  |HHHHHHHHHHUUYYYYYY                                                                      9   101     7.20     80.80
1160  |HHHHRRUUUUUUUUUUUUUUUUUU                                                               12   113     9.60     90.40
1170  |HHUU                                                                                    2   115     1.60     92.00
1180  |UUYY                                                                                    2   117     1.60     93.60
1190  |HHHHHHHHRRRRUUUU                                                                        8   125     6.40    100.00
      ----+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
          2   4   6   8  10  12  14  16  18  20  22  24  26  28  30  32  34

                                    FREQUENCY
```

Figure 22. Herp-patrol point analysis of calling frogs on the Middle Pool site during SY2. Point = midpoint of 10-m section of herp-patrol transect.

FREQUENCY BAR CHART



POINT	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
1000	2	2	0.87	0.87
1010	4	6	1.75	2.62
1020	7	13	3.06	5.68
1030	8	21	3.49	9.17
1040	9	30	3.93	13.10
1050	12	42	5.24	18.34
1060	9	51	3.93	22.27
1070	11	62	4.80	27.07
1080	16	78	6.99	34.06
1090	12	90	5.24	39.30
1100	12	102	5.24	44.54
1110	20	122	8.73	53.28
1120	18	140	7.86	61.14
1130	16	156	6.99	68.12
1140	17	173	7.42	75.55
1150	9	182	3.93	79.48
1160	12	194	5.24	84.72
1170	11	205	4.80	89.52
1180	8	213	3.49	93.01
1190	16	229	6.99	100.00

Figure 23. Herp-patrol point analysis of calling frogs on the Middle Pool site during SY3. Point = midpoint of 10-m section of herp-patrol transect.

FREQUENCY BAR CHART

TRIP	TRAPS		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
11 AUG 77	14	NNNNNNNNNNSSSSSSSSSS	2	2	2.06	2.06
8 SEP 77	14		0	2	0.00	2.06
20 SEP 77	12	AAAAAAAAAALLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL	5	7	5.15	7.22
18 NOV 77	14	SSSSSSSSSS	1	8	1.03	8.25
15 DEC 77	14		0	8	0.00	8.25
29 DEC 77	14		0	8	0.00	8.25
11 JAN 78	14		0	8	0.00	8.25
30 JAN 78	14		0	8	0.00	8.25
13 FEB 78	20		0	8	0.00	8.25
27 FEB 78	21		0	8	0.00	8.25
20 MAR 78	20	&&&&&&&&&&AAAAAAAAAA	2	10	2.06	10.31
28 MAR 78	20	AAAAAAAAAALLLLLLLLLLLLLLLLLLLLNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN	6	16	6.19	16.49
10 APR 78	20	++++++++++AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAKKKKKKKKKKLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL	8	24	8.25	24.74
23 APR 78	20	KKKKKKKKKK	1	25	1.03	25.77
4 MAY 78	15	AAAAAAAAAALLLLLLLLLL	2	27	2.06	27.84
22 MAY 78	15	&&&&&&&&&&SSSSSSSSSS	2	29	2.06	29.90
20 JUN 78	21		0	29	0.00	29.90
26 JUN 78	20	AAAAAAAAAA	1	30	1.03	30.93
9 JUL 78	20	++++++++++**********AAAAAAAAAA	3	33	3.09	34.02
27 JUL 78	20	NNNNNNNNNNNNNNNNNNNNNNNNNNNNNN	3	36	3.09	37.11
15 AUG 78	20	FFFFFFFFFF	1	37	1.03	38.14
1 SEP 78	20	++++++++++&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&AAAAAAAAAAAAAAAAAAAALLLLLLLLLL	7	44	7.22	45.36
14 SEP 78	20	LLLLLLLLLLRRRRRRRRRRRRRRRRRRRR	3	47	3.09	48.45
30 SEP 78	20	++++++++++++++++++++AAAAAAAAAA	3	50	3.09	51.55
14 OCT 78	18	++++++++++AAAAAAAAAARRRRRRRRRR	3	53	3.09	54.64
04 NOV 78	20	WWWWWWWWWW	1	54	1.03	55.67
17 NOV 78	20		0	54	0.00	55.67
01 DEC 78	20	&&&&&&&&&&RRRRRRRRRR	2	56	2.06	57.73
16 DEC 78	20		0	56	0.00	57.73
13 JAN 79	20	&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&	5	61	5.15	62.89
19 JAN 79	20	JJJJJJJJJJLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL	4	65	4.12	67.01
03 FEB 79	20		0	65	0.00	67.01
18 FEB 79	20	&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&	5	70	5.15	72.16
03 MAR 79	20	&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&	3	73	3.09	75.26
14 MAR 79	20	++++++++++&&&&&&&&&&	2	75	2.06	77.32
07 APR 79	20	NNNNNNNNNN	1	76	1.03	78.35
21 APR 79	20		0	76	0.00	78.35
12 MAY 79	20	&&&&&&&&&&&&&&&&&&&&&&&&&&&&&&JJJJJJJJJJ	4	80	4.12	82.47
26 MAY 79	20	UUUUUUUUUU	1	81	1.03	83.51
13 JUN 79	20		0	81	0.00	83.51
26 JUN 79	20	&&&&&&&&&&&&&&&&&&&&	2	83	2.06	85.57
11 JUL 79	20	&&&&&&&&&&&&&&&&&&&&	2	85	2.06	87.63
24 JUL 79	20	++++++++++AAAAAAAAAA	2	87	2.06	89.69
22 AUG 79	19	++++++++++	1	88	1.03	90.72
29 AUG 79	20	&&&&&&&&&&&&&&&&&&&&SSSSSSSSSS	3	91	3.09	93.81
13 SEP 79	20		0	91	0.00	93.81
25 SEP 79	20	AAAAAAAAAA	1	92	1.03	94.85
14 OCT 79	40		0	92	0.00	94.85
20 NOV 79	40	JJJJJJJJJJLLLLLLLLLLUUUUUUUUUU	3	95	3.09	97.94
19 DEC 79	40	RRRRRRRRRR	1	96	1.03	98.97
09 FEB 80	40		0	96	0.00	98.97
08 MAR 80	40		0	96	0.00	98.97
12 APR 80	40		0	96	0.00	98.97
10 MAY 80	40		0	96	0.00	98.97
14 JUN 80	40		0	96	0.00	98.97
09 JUL 80	40	WWWWWWWWWW	1	97	1.03	100.00
15 AUG 80	40		0	97	0.00	100.00
05 SEP 80	40		0	97	0.00	100.00

1 2 3 4 5 6 7 8

FREQUENCY

Figure 24. Funnel trap trip analysis of amphibians and reptiles on the Middle Pool site. Trip = date of trapping; traps = total number of traps set on a date.

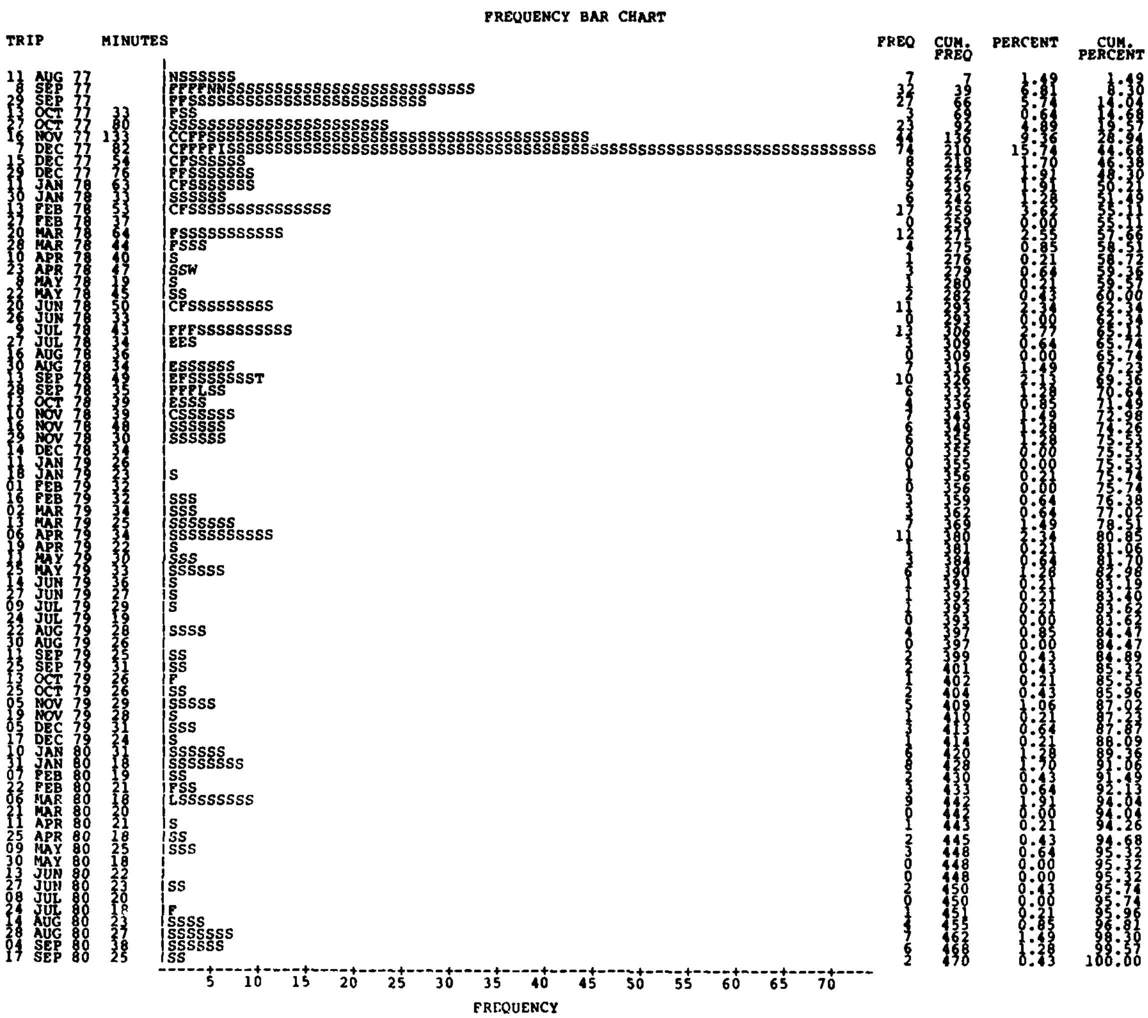


Figure 25. Herp-patrol trip analysis of salamanders and reptiles on the Middle Pool site (2000 and 3000 series combined). Trip = date of herp-patrol; minutes = total sampling time of a herp-patrol on a date (time not recorded prior to 13 October 1977).

FREQUENCY BAR CHART

TRIP	MINUTES		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
	1		0	0	0.00	0.00
	2	HHHHHHHHHHRRYYYYY	33	33	5.31	5.31
	3	HHHYY	9	42	1.45	6.75
13 OCT 77	33		0	42	0.00	6.75
27 OCT 77	80		0	42	0.00	6.75
16 NOV 77	72		0	42	0.00	6.75
7 DEC 77	82		0	42	0.00	6.75
15 DEC 77	54		0	42	0.00	6.75
29 DEC 77	51		0	42	0.00	6.75
11 JAN 78	41	U	1	43	0.16	6.91
30 JAN 78	14		0	43	0.00	6.91
13 FEB 78	37		0	43	0.00	6.91
27 FEB 78	19	UU	3	46	0.48	7.40
20 MAR 78	35	RUY	3	49	0.48	7.88
28 MAR 78	24	RUU	5	54	0.80	8.68
10 APR 78	22	RY	2	56	0.32	9.00
23 APR 78	19	RRUUYYY	13	69	2.09	11.09
9 MAY 78	19		0	69	0.00	11.09
22 MAY 78	45		0	69	0.00	11.09
20 JUN 78	31	HHR	4	73	0.64	11.74
26 JUN 78	16	GGHHHRYY	14	87	2.25	13.99
10 JUL 78	23	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHRRYYYYYYYYYYYYYY	124	211	19.94	33.92
27 JUL 78	17	BBBR	7	218	1.13	35.05
16 AUG 78	18	UYYYYYYYYYYYYYYY	31	249	4.98	40.03
31 AUG 78	19	GHRYYYYY	15	264	2.41	42.44
13 SEP 78	25	RRU	4	268	0.64	43.09
29 SEP 78	20		0	268	0.00	43.09
13 OCT 78	19		0	268	0.00	43.09
10 NOV 78	19		0	268	0.00	43.09
16 NOV 78	27		0	268	0.00	43.09
29 NOV 78	15		0	268	0.00	43.09
14 DEC 78	17		0	268	0.00	43.09
11 JAN 79	12		0	268	0.00	43.09
18 JAN 79	13	UUUUUUU	14	282	2.25	45.34
1 FEB 79	19		0	282	0.00	45.34
16 FEB 79	13	UUU	5	287	0.80	46.14
2 MAR 79	15		0	287	0.00	46.14
13 MAR 79	12	U	2	289	0.32	46.46
6 APR 79	18	U	1	290	0.16	46.62
19 APR 79	14	R	1	291	0.16	46.78
11 MAY 79	20	HRU	6	297	0.96	47.75
25 MAY 79	14	RY	3	300	0.48	48.23
14 JUN 79	16		0	300	0.00	48.23
27 JUN 79	16		0	300	0.00	48.23
9 JUL 79	17	HHHHHHHHHHHHR	26	326	4.18	52.41
24 JUL 79	10	HU	4	330	0.64	53.05
22 AUG 79	14	RUY	4	334	0.64	53.70
30 AUG 79	18	HHHHYYYYYYYY	24	358	3.86	57.56
11 SEP 79	12	HHHHHHHHYYYYYYYYY	33	391	5.31	62.86
25 SEP 79	15	HY	2	393	0.32	63.18
13 OCT 79	16	RUU	5	398	0.80	63.99
25 OCT 79	15	U	1	399	0.16	64.15
5 NOV 79	13	UU	3	402	0.48	64.63
19 NOV 79	13	UUUUUUUUUU	20	422	3.22	67.85
5 DEC 79	15	UUUUUU	12	434	1.93	69.77
17 DEC 79	13		0	434	0.00	69.77
10 JAN 80	14	UUUUUUU	13	447	2.09	71.86
31 JAN 80	9		0	447	0.00	71.86
7 FEB 80	5		0	447	0.00	71.86
22 FEB 80	10	UUUUU	10	457	1.61	73.47
6 MAR 80	10	YYY	5	462	0.80	74.28
21 MAR 80	11	RU	3	465	0.48	74.76
11 APR 80	9	RUU	5	470	0.80	75.56
25 APR 80	9	RUU	5	475	0.80	76.37
9 MAY 80	15	RY	3	478	0.48	76.85
30 MAY 80	11	HHHHHRRUYYYY	22	500	3.54	80.39
13 JUN 80	13	HHHHHHHHU	17	517	2.73	83.12
27 JUN 80	11	HHHHHHHHHHHHHHHHHRRRR	42	559	6.75	89.87
8 JUL 80	10	HHHHHHHHRRRUY	21	580	3.38	93.25
24 JUL 80	10	GHHRRRY	12	592	1.93	95.18
14 AUG 80	13	RU	3	595	0.48	95.66
28 AUG 80	15	HRRY	7	602	1.13	96.78
4 SEP 80	15	HRUUYY	9	611	1.45	98.23
17 SEP 80	15	RYYYYY	11	622	1.77	100.00

10 20 30 40 50 60 70 80 90 100 110 120

FREQUENCY

Figure 26. Herp-patrol trip analysis of calling frogs on the Middle Pool site. Trip = date of herp-patrol; minutes = total sampling time of a herp-patrol on a date (time not recorded prior to 13 October 1977).

```
                                        FREQUENCY BAR CHART
                                                                                          FREQ  CUM.   PERCENT    CUM.
POINT TRAPS                                                                                     FREQ             PERCENT
                |
 1010  23       |&&&&&AAAAAAAAAAAAAAAAAAAAAAAAAAAAAALLLLL                                    8     8     4.47      4.47
 1020  23       |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAALLLLLNNNNN                                    8    16     4.47      8.94
 1030  22       |$$$$$AAAAAAAAAAAAAAAAAAAAAAAAAAAAAALLLLLLLLLL                               9    25     5.03     13.97
 1040  22       |AAAAAAAAAAAAAAALLLLLLLLLLLLLLLNNNNNNNNNNNNNNN                               9    34     5.03     18.99
 1050  23       |&&&&&AAAAAAAAAAAAAAAAAAAAAAAAAAAAAA                                         7    41     3.91     22.91
 1060  23       |AAAAAAAAAAAAAAAAAAAANNNNNNNNNNNNNNN                                         7    48     3.91     26.82
 1070  23       |&&&&&AAAAAAAAAAAAAAAAAAAAAAAAANNNNN                                         7    55     3.91     30.73
 1080  23       |AAAAAAAAAAAAAAAAAAAAAAAAA                                                   5    60     2.79     33.52
 1090  23       |+++++AAAAAAAAAAAAAAAAAAAA                                                   5    65     2.79     36.31
 1100  23       |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAANNNNN                                         7    72     3.91     40.22
 1110  23       |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAALLLLLNNNNN                               9    81     5.03     45.25
 1120  23       |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAFFFFFLLLLLLLLLL               12    93     6.70     51.96
 1130  23       |AAAAAAAAAAAAAAAAAAAAAAAAALLLLL                                              6    99     3.35     55.31
 1140  20       |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAALLLLLNNNNNNNNNNRRRRR                    11   110     6.15     61.45
 1150  20       |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAALLLLLLLLLLLLLLLLLLLLLLLLLRRRRR          13   123     7.26     68.72
 1160  20       |+++++$$$$$$$$$$$$$$$AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAALLLLLLLLLLOOOOORRRRR 16   139     8.94     77.65
 1170  20       |$$$$$$$$$$AAAAAAAAAAAAAAAAAAAAAAAAAAAAAALLLLLLLLLLLLLLL                    11   150     6.15     83.80
 1180  20       |AAAAAAAAAAAAAAAAAAAAAAAAALLLLL                                              6   156     3.35     87.15
 1190  20       |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAALLLLLLLLLLLLLLL 16   172     8.94     96.09
 1200  17       |AAAAAAAAAAAAAAAAAAAAAAAAALLLLLLLLLL                                         7   179     3.91    100.00
                -----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+----+
                     1    2    3    4    5    6    7    8    9   10   11   12   13   14   15   16

                                              FREQUENCY
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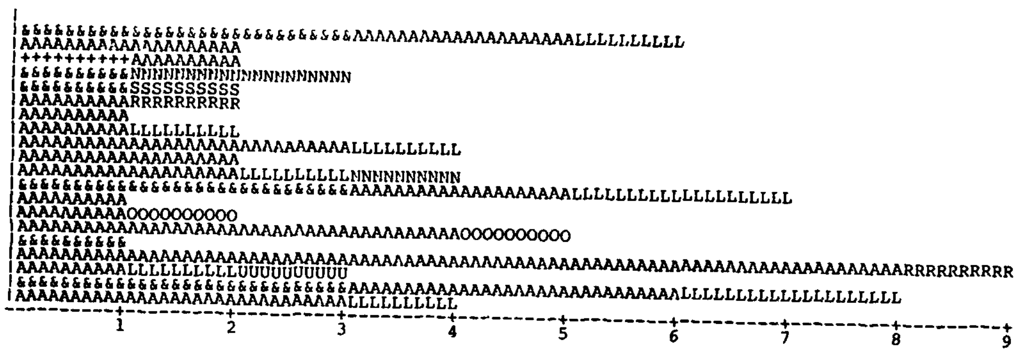
Figure 27. Funnel trap point analysis of amphibians and reptiles on the East Pool site during SY1. Point = location where traps were set; traps = total number of traps set at a sample point.

FREQUENCY BAR CHART



MIDPOINT POINT	TRAPS	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
1010	23	6	6	8.57	8.57
1020	23	2	8	2.86	11.43
1030	23	2	10	2.86	14.29
1040	23	3	13	4.29	18.57
1050	23	2	15	2.86	21.43
1060	23	2	17	2.86	24.29
1070	23	1	18	1.43	25.71
1080	23	2	20	2.86	28.57
1090	23	4	24	5.71	34.29
1100	23	2	26	2.86	37.14
1110	23	4	30	5.71	42.86
1120	23	7	37	10.00	52.86
1130	22	1	38	1.43	54.29
1140	23	2	40	2.86	57.14
1150	23	5	45	7.14	64.29
1160	23	1	46	1.43	65.71
1170	23	9	55	12.86	78.57
1180	23	3	58	4.29	82.86
1190	22	8	66	11.43	94.29
1200	21	4	70	5.71	100.00

Figure 28. Funnel trap point analysis of amphibians and reptiles on the East Pool site during SY2. Point = location where traps were set; traps = total number of traps set at a sample point.

```
                                          FREQUENCY BAR CHART
POINT  TRAPS                                                                                          FREQ  CUM.   PERCENT   CUM.
                                                                                                            FREQ             PERCENT
             |
 1010  26    |                                                                                           0     0     0.00      0.00
 1020  26    |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA                                                   2     2     7.41      7.41
 1030  26    |LLLLLLLLLLLLLLLLLLLLNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNNN   4     6    14.81     22.22
 1040  26    |                                                                                           0     6     0.00     22.22
 1050  26    |NNNNNNNNNNNNNNNNNNNN                                                                       1     7     3.70     25.93
 1060  26    |                                                                                           0     7     0.00     25.93
 1070  26    |                                                                                           0     7     0.00     25.93
 1080  26    |                                                                                           0     7     0.00     25.93
 1090  26    |                                                                                           0     7     0.00     25.93
 1100  26    |                                                                                           0     7     0.00     25.93
 1110  26    |                                                                                           0     7     0.00     25.93
 1120  26    |++++++++++++++++++++                                                                       1     8     3.70     29.63
 1130  26    |                                                                                           0     8     0.00     29.63
 1140  26    |                                                                                           0     8     0.00     29.63
 1150  26    |                                                                                           0     8     0.00     29.63
 1160  26    |LLLLLLLLLLLLLLLLLLLL                                                                       1     9     3.70     33.33
 1170  26    |                                                                                           0     9     0.00     33.33
 1180  26    |                                                                                           0     9     0.00     33.33
 1190  26    |                                                                                           0     9     0.00     33.33
 1200  26    |                                                                                           0     9     0.00     33.33
 1210  26    |                                                                                           0     9     0.00     33.33
 1220  26    |                                                                                           0     9     0.00     33.33
 1230  26    |                                                                                           0     9     0.00     33.33
 1240  26    |                                                                                           0     9     0.00     33.33
 1250  26    |                                                                                           0     9     0.00     33.33
 1260  26    |                                                                                           0     9     0.00     33.33
 1270  26    |OOOOOOOOOOOOOOOOOOOO                                                                       1    10     3.70     37.04
 1280  26    |AAAAAAAAAAAAAAAAAAAA                                                                       1    11     3.70     40.74
 1290  26    |                                                                                           0    11     0.00     40.74
 1300  26    |AAAAAAAAAAAAAAAAAAAA                                                                       1    12     3.70     44.44
 1310  20    |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA                                                   2    14     7.41     51.85
 1320  20    |AAAAAAAAAAAAAAAAAAAAOOOOOOOOOOOOOOOOOOOO                                                   2    16     7.41     59.26
 1330  20    |                                                                                           0    16     0.00     59.26
 1340  20    |AAAAAAAAAAAAAAAAAAAA                                                                       1    17     3.70     62.96
 1350  20    |                                                                                           0    17     0.00     62.96
 1360  20    |                                                                                           0    17     0.00     62.96
 1370  20    |                                                                                           0    17     0.00     62.96
 1380  20    |                                                                                           0    17     0.00     62.96
 1390  20    |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAARRRRRRRRRRRRRRRRRRRR                               3    20    11.11     74.07
 1400  20    |++++++++++++++++++++                                                                       1    21     3.70     77.78
 1410  20    |AAAAAAAAAAAAAAAAAAAA                                                                       1    22     3.70     81.48
 1420  20    |AAAAAAAAAAAAAAAAAAAA                                                                       1    23     3.70     85.19
 1430  20    |                                                                                           0    23     0.00     85.19
 1440  20    |NNNNNNNNNNNNNNNNNNNN                                                                       1    24     3.70     88.89
 1450  20    |                                                                                           0    24     0.00     88.89
 1460  20    |AAAAAAAAAAAAAAAAAAAANNNNNNNNNNNNNNNNNNNN                                                   2    26     7.41     96.30
 1470  20    |SSSSSSSSSSSSSSSSSSSS                                                                       1    27     3.70    100.00
             --------------------+-------------------+-------------------+-------------------+
                                 1                   2                   3                   4
                                                FREQUENCY
```

Figure 29. Funnel trap point analysis of amphibians and reptiles on the East Pool site during SY3, including the extended trapline. Point = location where traps were set; traps = total number of traps set at a sample point.

```
                                   FREQUENCY BAR CHART
POINT
                                                                                      FREQ  CUM.   PERCENT    CUM.
      |                                                                                     FREQ             PERCENT
2010  |NNNNNNNNNNSSSSSSSSSS                                                            2      2     3.33      3.33
2020  |                                                                                0      2     0.00      3.33
2030  |SSSSSSSSSS                                                                      1      3     1.67      5.00
2040  |NNNNNNNNNN                                                                      1      4     1.67      6.67
2050  |                                                                                0      4     0.00      6.67
2060  |CCCCCCCCCCSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS                    6     10    10.00     16.67
2070  |SSSSSSSSSS                                                                      1     11     1.67     18.33
2080  |FFFFFFFFFFSSSSSSSSSS                                                            2     13     3.33     21.67
2090  |                                                                                0     13     0.00     21.67
2100  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSTTTTTTTTTT                                        4     17     6.67     28.33
2110  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS          7     24    11.67     40.00
2120  |FFFFFFFFFFSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS                    6     30    10.00     50.00
2130  |FFFFFFFFFFSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS                              5     35     8.33     58.33
2140  |SSSSSSSSSSSSSSSSSSSS                                                            2     37     3.33     61.67
2150  |SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS                    6     43    10.00     71.67
2160  |FFFFFFFFFFSSSSSSSSSSSSSSSSSSSS                                                  3     46     5.00     76.67
2170  |CCCCCCCCCCFFFFFFFFFFFFFFFFFFFFLLLLLLLLLLSSSSSSSSSSTTTTTTTTTT                    6     52    10.00     86.67
2180  |FFFFFFFFFFFFFFFFFFFFSSSSSSSSSS                                                  3     55     5.00     91.67
2190  |FFFFFFFFFFFFFFFFFFFFFFFFFFFFFF                                                  3     58     5.00     96.67
2200  |FFFFFFFFFFSSSSSSSSSS                                                            2     60     3.33    100.00
      ----------+---------+---------+---------+---------+---------+---------+
                1         2         3         4         5         6         7

                                   FREQUENCY
```

Figure 30. Herp-patrol point analysis of salamanders and reptiles on the East Pool site during SY1. Point = midpoint of 10-m section of herp-patrol transect.

```
                              FREQUENCY BAR CHART
POINT                                                                   FREQ  CUM.   PERCENT    CUM.
                                                                              FREQ             PERCENT
        |
2010    |                                                                  0     0      0.00       0.00
2020    |                                                                  0     0      0.00       0.00
2030    |                                                                  0     0      0.00       0.00
2040    |SSSSSSSSSS                                                        1     1      4.55       4.55
2050    |                                                                  0     1      0.00       4.55
2060    |LLLLLLLLLL                                                        1     2      4.55       9.09
2070    |FFFFFFFFFFNNNNNNNNNN                                              2     4      9.09      18.18
2080    |SSSSSSSSSS                                                        1     5      4.55      22.73
2090    |                                                                  0     5      0.00      22.73
2100    |FFFFFFFFFF                                                        1     6      4.55      27.27
2110    |                                                                  0     6      0.00      27.27
2120    |                                                                  0     6      0.00      27.27
2130    |                                                                  0     6      0.00      27.27
2140    |FFFFFFFFFFFFFFFFFFFFLLLLLLLLLL                                    3     9     13.64      40.91
2150    |                                                                  0     9      0.00      40.91
2160    |CCCCCCCCCCFFFFFFFFFFLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLNNNNNNNNNN      6    15     27.27      68.18
2170    |FFFFFFFFFFFFFFFFFFFF                                              2    17      9.09      77.27
2180    |NNNNNNNNNNSSSSSSSSSS                                              2    19      9.09      86.36
2190    |                                                                  0    19      0.00      86.36
2200    |FFFFFFFFFFSSSSSSSSSSSSSSSSSSSS                                    3    22     13.64     100.00
        ----------+---------+---------+---------+---------+---------+
                  1         2         3         4         5         6

                                   FREQUENCY
```

Figure 31. Herp-patrol point analysis of salamanders and reptiles on the East Pool site during SY2. Point = midpoint of 10-m section of herp-patrol transect.

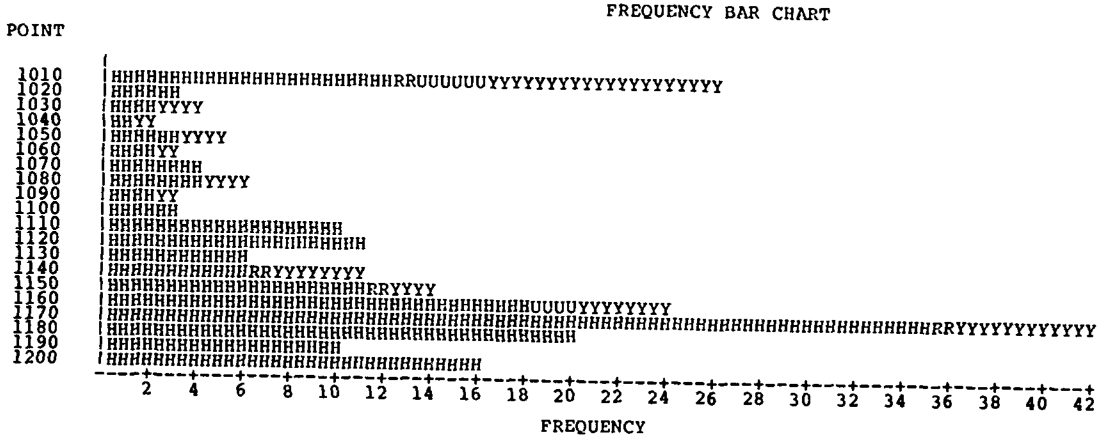
```
                              FREQUENCY BAR CHART

POINT                                                          FREQ  CUM.  PERCENT    CUM.
                                                                     FREQ           PERCENT
      |
2010  |                                                          0     0     0.00      0.00
2020  |                                                          0     0     0.00      0.00
2030  |                                                          0     0     0.00      0.00
2040  |                                                          0     0     0.00      0.00
2050  |LLLLLLLLLLLLLLLLLLLL                                      2     2     4.35      4.35
2060  |FFFFFFFFFFSSSSSSSSSS                                      2     4     4.35      8.70
2070  |CCCCCCCCCCLLLLLLLLLL                                      2     6     4.35     13.04
2080  |                                                          0     6     0.00     13.04
2090  |FFFFFFFFFFLLLLLLLLLLTTTTTTTTTT                            3     9     6.52     19.57
2100  |CCCCCCCCCCFFFFFFFFFFLLLLLLLLLL                            3    12     6.52     26.09
2110  |FFFFFFFFFFSSSSSSSSSS                                      2    14     4.35     30.43
2120  |                                                          0    14     0.00     30.43
2130  |FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFLLLLLLLLLLLLLLLLLLLLLLLLLLLLLL  6    20    13.04     43.48
2140  |FFFFFFFFFFFFFFFFFFFF                                      2    22     4.35     47.83
2150  |FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFLLLLLLLLLLSSSSSSSSSSSSSSSSSSSS  6    28    13.04     60.87
2160  |FFFFFFFFFFFFFFFFFFFF                                      2    30     4.35     65.22
2170  |FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFSSSSSSSSSS  6    36    13.04     78.26
2180  |FFFFFFFFFFLLLLLLLLLLSSSSSSSSSSSSSSSSSSSS                  4    40     8.70     86.96
2190  |LLLLLLLLLL                                                1    41     2.17     89.13
2200  |FFFFFFFFFFLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLNNNNNNNNNN        5    46    10.87    100.00
      ----------+---------+---------+---------+---------+---------+
                1         2         3         4         5         6

                               FREQUENCY
```

Figure 32. Herp-patrol point analysis of salamanders and reptiles on the East Pool site during SY3. Point = midpoint of 10-m section of herp-patrol transect.

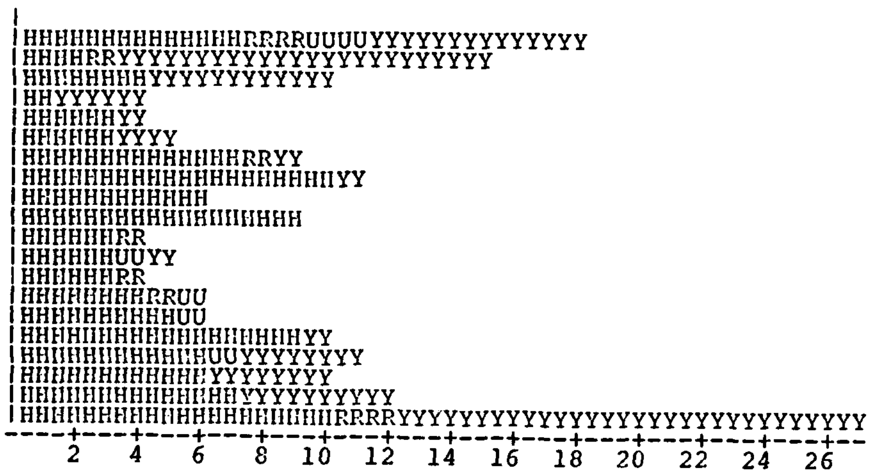
FREQUENCY BAR CHART



POINT	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
1010	26	26	11.66	11.66
1020	3	29	1.35	13.00
1030	4	33	1.79	14.80
1040	2	35	0.90	15.70
1050	5	40	2.24	17.9[illegible]
1060	3	43	1.35	19.[illegible]
1070	4	47	1.79	21.0[illegible]
1080	6	53	2.69	23.77
1090	3	56	1.35	25.11
1100	3	59	1.35	26.46
1110	10	69	4.48	30.94
1120	11	80	4.93	35.87
1130	6	86	2.69	38.57
1140	11	97	4.93	43.50
1150	14	111	6.28	49.78
1160	24	135	10.76	60.54
1170	42	177	18.83	79.37
1180	20	197	8.97	88.34
1190	10	207	4.48	92.83
1200	16	223	7.17	100.00

Figure 33. Herp-patrol point analysis of calling frogs on the East Pool site during SY1. Point = midpoint of 10-m section of herp-patrol transect.

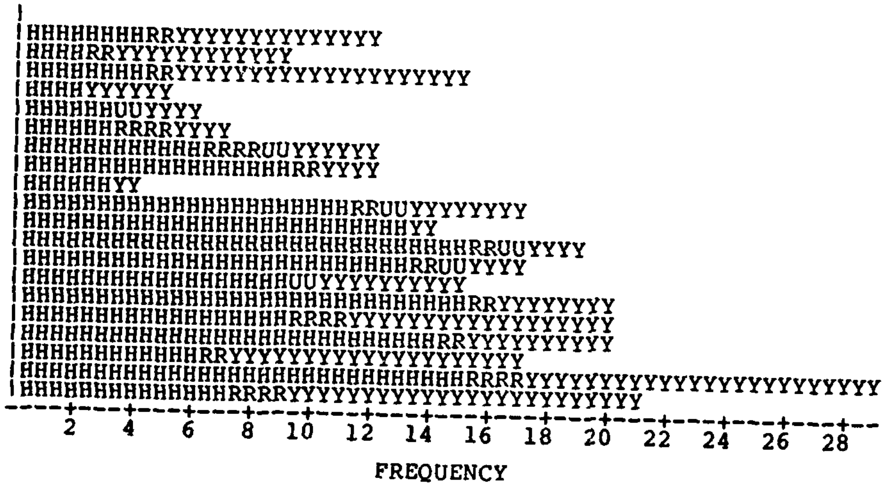
FREQUENCY BAR CHART



POINT	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
1010	18	18	9.68	9.68
1020	15	33	8.06	17.74
1030	10	43	5.38	23.12
1040	4	47	2.15	25.27
1050	4	51	2.15	27.42
1060	5	56	2.69	30.11
1070	9	65	4.84	34.95
1080	11	76	5.91	40.86
1090	6	82	3.23	44.09
1100	9	91	4.84	48.92
1110	4	95	2.15	51.08
1120	5	100	2.69	53.76
1130	4	104	2.15	55.91
1140	6	110	3.23	59.14
1150	6	116	3.23	62.37
1160	10	126	5.38	67.74
1170	11	137	5.91	73.66
1180	10	147	5.38	79.03
1190	12	159	6.45	85.48
1200	27	186	14.52	100.00

Figure 34. Herp-patrol point analysis of calling frogs on the East Pool site during SY2. Point = midpoint of 10-m section of herp-patrol transect.

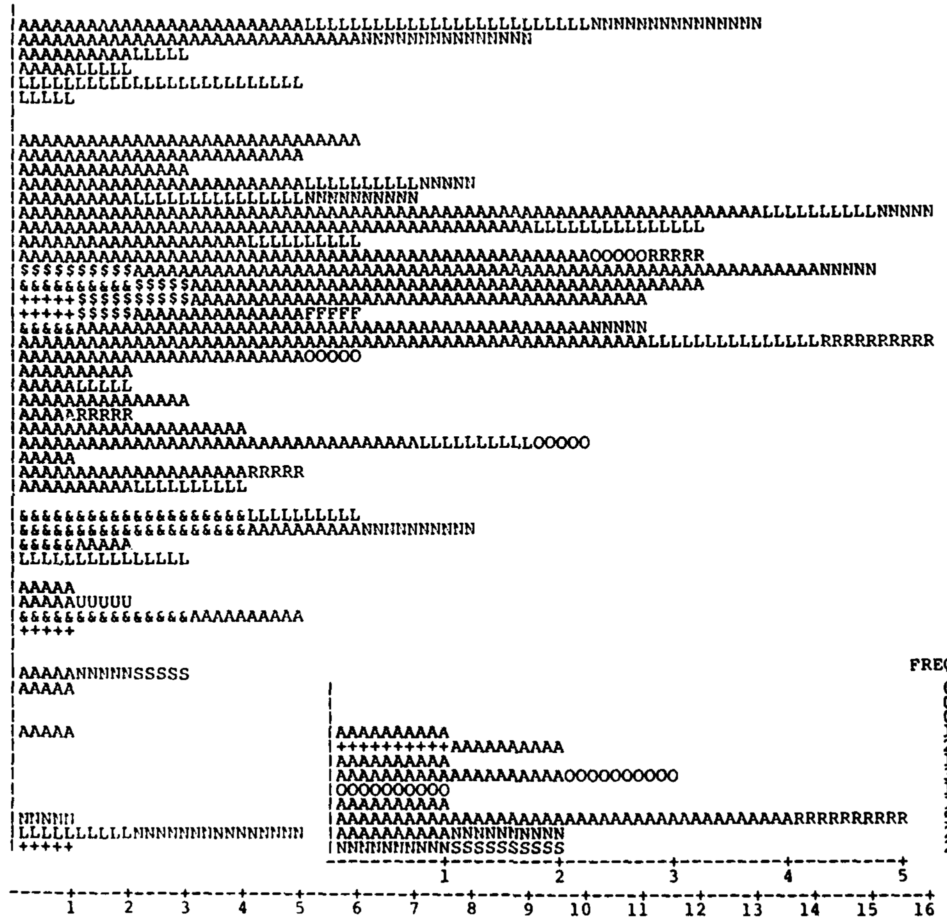
FREQUENCY BAR CHART



POINT	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
1010	12	12	4.12	4.12
1020	9	21	3.09	7.22
1030	15	36	5.15	12.37
1040	5	41	1.72	14.09
1050	6	47	2.06	16.15
1060	7	54	2.41	18.56
1070	12	66	4.12	22.68
1080	12	78	4.12	26.80
1090	4	82	1.37	28.18
1100	17	99	5.84	34.02
1110	14	113	4.81	38.83
1120	19	132	6.53	45.36
1130	17	149	5.84	51.20
1140	15	164	5.15	56.36
1150	20	184	6.87	63.23
1160	20	204	6.87	70.10
1170	20	224	6.87	76.98
1180	17	241	5.84	82.82
1190	29	270	9.97	92.78
1200	21	291	7.22	100.00

Figure 35. Herp-patrol point analysis of calling frogs on the East Pool site during SY3. Point = midpoint of 10-m section of herp-patrol transect.

FREQUENCY BAR CHART



TRIP	TRAPS	FREQ (insert)	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
18 AUG 77	13		13	13	5.04	5.04
22 SEP 77	13		9	22	3.49	8.53
27 OCT 77	13		3	25	1.16	9.69
7 DEC 77	20		2	27	0.78	10.47
23 DEC 77	20		5	32	1.94	12.40
11 JAN 78	20		1	33	0.39	12.79
30 JAN 78	18		0	33	0.00	12.79
15 FEB 78	20		0	33	0.00	12.79
28 FEB 78	20		6	39	2.33	15.12
22 MAR 78	20		5	44	1.94	17.05
29 MAR 78	20		3	47	1.16	18.22
12 APR 78	20		8	55	3.10	21.32
25 APR 78	20		7	62	2.71	24.03
9 MAY 78	19		16	78	6.20	30.23
23 MAY 78	19		12	90	4.65	34.88
20 JUN 78	19		6	96	2.33	37.21
27 JUN 78	20		12	108	4.65	41.86
10 JUL 78	20		15	123	5.81	47.67
27 JUL 78	20		12	135	4.65	52.33
15 AUG 78	20		11	146	4.26	56.59
31 AUG 78	20		6	152	2.33	58.91
12 SEP 78	20		11	163	4.26	63.18
18 SEP 78	20		16	179	6.20	69.38
13 OCT 78	20		6	185	2.33	71.71
03 NOV 78	20		2	187	0.78	72.48
17 NOV 78	20		2	189	0.78	73.26
30 NOV 78	20		3	192	1.16	74.42
15 DEC 78	20		2	194	0.78	75.19
12 JAN 79	20		4	198	1.55	76.74
20 JAN 79	20		10	208	3.88	80.62
02 FEB 79	20		1	209	0.39	81.01
17 FEB 79	20		5	214	1.94	82.95
02 MAR 79	20		4	218	1.55	84.50
15 MAR 79	20		0	218	0.00	84.50
06 APR 79	19		6	224	2.33	86.82
20 APR 79	20		8	232	3.10	89.92
11 MAY 79	20		2	234	0.78	90.70
25 MAY 79	20		3	237	1.16	91.86
14 JUN 79	20		0	237	0.00	91.86
27 JUN 79	19		1	238	0.39	92.25
10 JUL 79	20		2	240	0.78	93.02
25 JUL 79	20		5	245	1.94	94.96
23 AUG 79	18		1	246	0.39	95.35
30 AUG 79	20		0	246	0.00	95.35
12 SEP 79	20		0	246	0.00	95.35
26 SEP 79	20		3	249	1.16	96.51
27 OCT 79	60	0	1	250	0.39	96.90
07 NOV 79	60	0	0	250	0.00	96.90
06 DEC 79	60	0	0	250	0.00	96.90
12 JAN 80	94	1	1	251	0.39	97.29
08 FEB 80	94	2	0	251	0.00	97.29
08 MAR 80	94	1	0	251	0.00	97.29
12 APR 80	94	3	0	251	0.00	97.29
10 MAY 80	94	1	0	251	0.00	97.29
13 JUN 80	92	1	0	251	0.00	97.29
09 JUL 80	94	5	1	252	0.39	97.67
15 AUG 80	94	2	5	257	1.94	99.61
05 SEP 80	94	2	1	258	0.39	100.00

Figure 36. Funnel trap trip analysis of amphibians and reptiles on the East Pool site. Insert presents results of the extended trapline from markers 1210 to 1470 (see paragraph 109 for details). Trip = date of trapping; traps = total number of traps set on a date.

FREQUENCY BAR CHART

TRIP	MINUTES		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
14 JUL 77			0	0	0.00	0.00
20 OCT 77	10	SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	7	7	5.19	5.19
3 NOV 77	7	SSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	6	13	4.44	9.63
16 NOV 77	36	SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	12	25	8.89	18.52
7 DEC 77	34	SSSSSSSSSSSSSSSSSSSS	4	29	2.96	21.48
14 DEC 77	45	FFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	6	35	4.44	25.93
12 JAN 78	23		0	35	0.00	25.93
30 JAN 78	19		0	35	0.00	25.93
14 FEB 78	18		0	35	0.00	25.93
27 FEB 78	20	SSSSS	1	36	0.74	26.67
21 MAR 78	30	CCCCCCCCCCSSSSSSSSSSSSSSS	5	41	3.70	30.37
28 MAR 78	26	SSSSS	1	42	0.74	31.11
11 APR 78	33	FFFFFFFFFFFFFFF	3	45	2.22	33.33
24 APR 78	30		0	45	0.00	33.33
5 MAY 78	29	FFFFFFFFFF	2	47	1.48	34.81
23 MAY 78	39	TTTTT	1	48	0.74	35.56
19 JUN 78	39	SSSSSSSSSSSSSSS	3	51	2.22	37.78
27 JUN 78	19	LLLLL	1	52	0.74	38.52
10 JUL 78	31	FFFFFTTTTT	2	54	1.48	40.00
27 JUL 78	21		0	54	0.00	40.00
14 AUG 78	24	NNNNNSSSSS	2	56	1.48	41.48
31 AUG 78	25	SSSSS	1	57	0.74	42.22
13 SEP 78	29	SSSSSSSSSS	2	59	1.48	43.70
29 SEP 78	26	FFFFFNNNNN	2	61	1.48	45.19
13 OCT 78	37	SSSSS	1	62	0.74	45.93
10 NOV 78	24	SSSSS	1	63	0.74	46.67
18 NOV 78	8		0	63	0.00	46.67
30 NOV 78	25	FFFFFSSSSSSSSSS	3	66	2.22	48.89
15 DEC 78	20	FFFFF	1	67	0.74	49.63
12 JAN 79	17		0	67	0.00	49.63
19 JAN 79	20	FFFFF	1	68	0.74	50.37
02 FEB 79	16	SSSSS	1	69	0.74	51.11
17 FEB 79	19	FFFFF	1	70	0.74	51.85
02 MAR 79	20	NNNNNNNNNN	2	72	1.48	53.33
14 MAR 79	24	NNNNN	1	73	0.74	54.07
06 APR 79	23		0	73	0.00	54.07
20 APR 79	22		0	73	0.00	54.07
11 MAY 78	40		0	73	0.00	54.07
25 MAY 79	17		0	73	0.00	54.07
13 JUN 79	16		0	73	0.00	54.07
26 JUN 79	19	TTTTT	1	74	0.74	54.81
10 JUL 79	39	FFFFFLLLLLLLLLL	3	77	2.22	57.04
25 JUL 79	28	LLLLLLLLLL	2	79	1.48	58.52
22 AUG 79	26		0	79	0.00	58.52
23 AUG 79	18		0	79	0.00	58.52
12 SEP 79	38	FFFFFFFFFFFFFFFLLLLL	4	83	2.96	61.48
24 SEP 79	25	CCCCCFFFFFSSSSS	3	86	2.22	63.70
13 OCT 79	31	FFFFFFFFFF	2	88	1.48	65.19
26 OCT 79	28	LLLLL	1	89	0.74	65.93
06 NOV 79	36	FFFFFFFFFFSSSSS	3	92	2.22	68.15
19 NOV 79	31	LLLLLLLLLLSSSSS	3	95	2.22	70.37
05 DEC 79	50	FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFSSSSS	8	103	5.93	76.30
18 DEC 79	24	FFFFF	1	104	0.74	77.04
11 JAN 80	43	FFFFFFFFFFFFFFFFFFFFLLLLLSSSSSSSSSSSSSSS	8	112	5.93	82.96
01 FEB 80	18	SSSSS	1	113	0.74	83.70
08 FEB 80	25	FFFFF	1	114	0.74	84.44
23 FEB 80	18	FFFFF	1	115	0.74	85.19
07 MAR 80	23	CCCCCLLLLLNNNNN	3	118	2.22	87.41
21 MAR 80	23	CCCCC	1	119	0.74	88.15
11 APR 80	21		0	119	0.00	88.15
25 APR 80	22	LLLLL	1	120	0.74	88.89
09 MAY 80	20		0	120	0.00	88.89
30 MAY 80	23	FFFFFFFFFF	2	122	1.48	90.37
13 JUN 80	22	LLLLLLLLLL	2	124	1.48	91.85
27 JUN 80	23		0	124	0.00	91.85
23 JUL 80	23	FFFFFLLLLL	2	126	1.48	93.33
31 JUL 80	26	FFFFF	1	127	0.74	94.07
14 AUG 80	16	LLLLL	1	128	0.74	94.81
28 AUG 80	18	LLLLLLLLLL	2	130	1.48	96.30
04 SEP 80	15	LLLLLTTTTT	2	132	1.48	97.78
17 SEP 80	19	FFFFFLLLLLLLLLL	3	135	2.22	100.00

1 2 3 4 5 6 7 8 9 10 11 12

FREQUENCY

Figure 37. Herp-patrol trip analysis of salamanders and reptiles on the East Pool site. Trip = date of herp-patrol; minutes = total sampling time of a herp-patrol on a date (time not recorded prior to 13 October 1977).

FREQUENCY BAR CHART

TRIP	MINUTES		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
20 OCT 77	20		0	0	0.00	0.00
3 NOV 77	7		0	0	0.00	0.00
16 NOV 77	36		0	0	0.00	0.00
7 DEC 77	17		0	0	0.00	0.00
14 DEC 77	16		0	0	0.00	0.00
12 JAN 78	13	UUU	3	3	0.38	0.38
30 JAN 78	11		0	3	0.00	0.38
14 FEB 78	12	UUUUU	5	8	0.64	1.03
27 FEB 78	9	UUUUUUUUUU	10	18	1.28	2.31
21 MAR 78	16		0	18	0.00	2.31
28 MAR 78	14		0	18	0.00	2.31
11 APR 78	21	HHHHHHHHHHY	11	29	1.41	3.72
24 APR 78	17	HHHHHHHHHHYYYYY	15	44	1.92	5.64
5 MAY 78	14	HHHUUUUU	8	52	1.03	6.67
23 MAY 78	24	HHHHHHHHHHHHHHHHHHHH	20	72	2.56	9.23
19 JUN 78	23	HHHHHRYY	8	80	1.03	10.26
27 JUN 78	7	HHHHHHHHHHHHHHHHHHHHRRYYY	25	105	3.21	13.46
10 JUL 78	15	HHHHHHHHHHHHHHHHRRYYYYYYYY	26	131	3.33	16.79
27 JUL 78	10	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHYYYYY	45	176	5.77	22.56
14 AUG 78	10	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHY	45	221	5.77	28.33
31 AUG 78	15	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHYYYYYYYYY	50	271	6.41	34.74
13 SEP 78	16	HHHHHHHHHHHHRYYYYY	18	289	2.31	37.05
29 SEP 78	12		0	289	0.00	37.05
13 OCT 78	18		0	289	0.00	37.05
10 NOV 78	13		0	289	0.00	37.05
18 NOV 78	5		0	289	0.00	37.05
30 NOV 78	15		0	289	0.00	37.05
15 DEC 78	11		0	289	0.00	37.05
12 JAN 79	11	UUUU	4	293	0.51	37.56
19 JAN 79	9		0	293	0.00	37.56
2 FEB 79	7		0	293	0.00	37.56
17 FEB 79	10		0	293	0.00	37.56
2 MAR 79	11	YY	2	295	0.26	37.82
14 MAR 79	13	UUUUUUYYYY	10	305	1.28	39.10
6 APR 79	17	U	1	306	0.13	39.23
20 APR 79	16	HRU	3	309	0.38	39.62
11 MAY 79	20	HHHHHHR	7	316	0.90	40.51
25 MAY 79	9	HHRRYYYYYY	10	326	1.28	41.79
13 JUN 79	8	Y	1	327	0.13	41.92
26 JUN 79	10	RYY	3	330	0.38	42.31
10 JUL 79	19	HHHHHHHHHHHHHHHHHHHHHHHHHHRRRYYYYYYYYYY	39	369	5.00	47.31
25 JUL 79	13	HHY	3	372	0.38	47.69
22 AUG 79	15	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHYYYYY	39	411	5.00	52.69
28 AUG 79	13	HHHHHHHHRYYYYYY	15	426	1.92	54.62
12 SEP 79	20	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHYYYYYYYYYYYYYYYYYYYYYYY	53	479	6.79	61.41
24 SEP 79	14	HHRYYYYYY	9	488	1.15	62.56
13 OCT 79	17		0	488	0.00	62.56
26 OCT 79	16		0	488	0.00	62.56
6 NOV 79	20		0	488	0.00	62.56
19 NOV 79	19	UUUUU	5	493	0.64	63.21
5 DEC 79	35		0	493	0.00	63.21
18 DEC 79	15		0	493	0.00	63.21
11 JAN 80	17		0	493	0.00	63.21
1 FEB 80	10		0	493	0.00	63.21
8 FEB 80	13		0	493	0.00	63.21
22 FEB 80	5	Y	1	494	0.13	63.33
7 MAR 80	13	UY	2	496	0.26	63.59
21 MAR 80	14	YY	2	498	0.26	63.85
11 APR 80	13	RRYYYY	6	504	0.77	64.62
25 APR 80	12	HHHHRY	6	510	0.77	65.38
9 MAY 80	8	YYYYYYY	7	517	0.90	66.28
30 MAY 80	13	HRRYYY	6	523	0.77	67.05
13 JUN 80	11	HHHHHHHHHHHHHHHHHHHHHHHHHHHHRRYYYYYYYYYYY	41	564	5.26	72.31
27 JUN 80	17	HHHHHHHHRRRRRRRRYYYYYYYYYYYYYYYYYY	34	598	4.36	76.67
23 JUL 80	15	HHHHHHHHHHHRRYYYYYYYYYYYYY	26	624	3.33	80.00
31 JUL 80	16	HHHHHHYYYYY	11	635	1.41	81.41
14 AUG 80	10	HHHHHHHHHHYYYYYYYYYY	20	655	2.56	83.97
28 AUG 80	11	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHRYYYYYYYYY	43	698	5.51	89.49
4 SEP 80	8	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHY	47	745	6.03	95.51
17 SEP 80	10	HHHHHHHHHHHHHHHHHHHHRYYYYYYYYYYYYYY	35	780	4.49	100.00

5 10 15 20 25 30 35 40 45 50

FREQUENCY

Figure 38. Herp-patrol trip analysis of calling frogs on the East Pool site. Trip = date of herp-patrol; minutes = total sampling time of a herp-patrol on a date (time not recorded prior to 13 October 1977).

```
                                      FREQUENCY BAR CHART
POINT TRAPS                                                                  FREQ   CUM.   PERCENT    CUM.
                                                                                    FREQ             PERCENT
           |
   0  20   |                                                                   0      0     0.00      0.00
  10  20   |                                                                   0      0     0.00      0.00
  20  20   |                                                                   0      0     0.00      0.00
  30  20   |                                                                   0      0     0.00      0.00
  40  20   |                                                                   0      0     0.00      0.00
  50   0   |                                                                   0      0     0.00      0.00
  60  24   |                                                                   0      0     0.00      0.00
  70  24   |                                                                   0      0     0.00      0.00
  80  24   |                                                                   0      0     0.00      0.00
  90  24   |AAAAAAAAAALLLLLLLLLL                                               2      2     2.99      2.99
 100  24   |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAALLLLLLLLLL       6      8     8.96     11.94
 110  24   |LLLLLLLLLL                                                         1      9     1.49     13.43
 120  24   |                                                                   0      9     0.00     13.43
 130  24   |AAAAAAAAAAAAAAAAAAAA                                               2     11     2.99     16.42
 140  24   |                                                                   0     11     0.00     16.42
 150  24   |AAAAAAAAAALLLLLLLLLL                                               2     13     2.99     19.40
 160  24   |SSSSSSSSSS                                                         1     14     1.49     20.90
 170  24   |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA                 5     19     7.46     28.36
 180  24   |AAAAAAAAAA                                                         1     20     1.49     29.85
 190  20   |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAALLLLLLLLLL                 5     25     7.46     37.31
 200  19   |                                                                   0     25     0.00     37.31
 210  14   |                                                                   0     25     0.00     37.31
 220  14   |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAALLLLLLLLLLLLLLLLLLLLUUUUUUUUUU       6     31     8.96     46.27
 230  14   |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA                 5     36     7.46     53.73
 240  14   |AAAAAAAAAAAAAAAAAAAALLLLLLLLLL                                     3     39     4.48     58.21
 250  13   |AAAAAAAAAA                                                         1     40     1.49     59.70
 260  13   |AAAAAAAAAAAAAAAAAAAA                                               2     42     2.99     62.69
 270  12   |                                                                   0     42     0.00     62.69
 280   9   |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAASSSSSSSSSS                 5     47     7.46     70.15
 290   8   |AAAAAAAAAAAAAAAAAAAA                                               2     49     2.99     73.13
 300   8   |$$$$$$$$$$AAAAAAAAAA                                               2     51     2.99     76.12
 310   7   |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAALLLLLLLLLL                 5     56     7.46     83.58
 320   7   |AAAAAAAAAAAAAAAAAAAA                                               2     58     2.99     86.57
 330   6   |LLLLLLLLLLSSSSSSSSSS                                               2     60     2.99     89.55
 340   6   |AAAAAAAAAAAAAAAAAAAA                                               2     62     2.99     92.54
 350   6   |AAAAAAAAAAAAAAAAAAAA                                               2     64     2.99     95.52
 360   6   |AAAAAAAAAAAAAAAAAAAA                                               2     66     2.99     98.51
 370   6   |AAAAAAAAAA                                                         1     67     1.49    100.00
           ----------+---------+---------+---------+---------+---------+
                     1         2         3         4         5         6
                                        FREQUENCY
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Figure 39. Funnel trap point analysis of amphibians and reptiles on the West Pool site during SY1. Point = location where traps were set; traps = total number of traps set at a sample point.

FREQUENCY BAR CHART

POINT	TRAPS		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	18		0	0	0.00	0.00
10	21		0	0	0.00	0.00
20	21		0	0	0.00	0.00
30	22		0	0	0.00	0.00
40	22		0	0	0.00	0.00
50	0		0	0	0.00	0.00
60	23		0	0	0.00	0.00
70	22		0	0	0.00	0.00
80	23	AAAAAAAAAA	1	1	2.56	2.56
90	23	AAAAAAAAAA	1	2	2.56	5.13
100	23	AAAAAAAAAALLLLLLLLLLLLLLLLLLLLNNNNNNNNNN	4	6	10.26	15.38
110	23	AAAAAAAAAA	1	7	2.56	17.95
120	23	AAAAAAAAAA	1	8	2.56	20.51
130	23	AAAAAAAAAA	1	9	2.56	23.08
140	23		0	9	0.00	23.08
150	23		0	9	0.00	23.08
160	23		0	9	0.00	23.08
170	23	AAAAAAAAAA	1	10	2.56	25.64
180	23	&&&&&&&&&&	1	11	2.56	28.21
190	23	&&&&&&&&&&	1	12	2.56	30.77
200	23		0	12	0.00	30.77
210	22	AAAAAAAAAAAAAAAAAAAA	2	14	5.13	35.90
220	22		0	14	0.00	35.90
230	23	AAAAAAAAAAAAAAAAAAAALLLLLLLLLLLLLLLLLLLLLLLLLLLLLL	5	19	12.82	48.72
240	23	WWWWWWWWWW	1	20	2.56	51.28
250	23		0	20	0.00	51.28
260	23	AAAAAAAAAA	1	21	2.56	53.85
270	23	HHHHHHHHHH	1	22	2.56	56.41
280	23	AAAAAAAAAAGGGGGGGGGGWWWWWWWWWW	3	25	7.69	64.10
290	23		0	25	0.00	64.10
300	23		0	25	0.00	64.10
310	23	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAALLLLLLLLLL	8	33	20.51	84.62
320	23	OOOOOOOOOO	1	34	2.56	87.18
330	23		0	34	0.00	87.18
340	23	AAAAAAAAAA	1	35	2.56	89.74
350	23	AAAAAAAAAALLLLLLLLLLSSSSSSSSSSSSSSSSSSSS	4	39	10.26	100.00
360	23		0	39	0.00	100.00
370	23		0	39	0.00	100.00

1 2 3 4 5 6 7 8

FREQUENCY

Figure 40. Funnel trap point analysis of amphibians and reptiles on the West Pool site during SY2. Point = location where traps were set; traps = total number of traps set at a sample point.

FREQUENCY BAR CHART

```
POINT   TRAPS                                                        FREQ  CUM.  PERCENT   CUM.
                                                                           FREQ            PERCENT
                 |
    0   22       |                                                      0     0     0.00      0.00
   10   22       |                                                      0     0     0.00      0.00
   20   22       |                                                      0     0     0.00      0.00
   30   22       |                                                      0     0     0.00      0.00
   40   22       |                                                      0     0     0.00      0.00
   50    0       |                                                      0     0     0.00      0.00
   60   22       |                                                      0     0     0.00      0.00
   70   22       |                                                      0     0     0.00      0.00
   80   22       |                                                      0     0     0.00      0.00
   90   22       |                                                      0     0     0.00      0.00
  100   21       |                                                      0     0     0.00      0.00
  110   22       |                                                      0     0     0.00      0.00
  120   20       |                                                      0     0     0.00      0.00
  130   22       |                                                      0     0     0.00      0.00
  140   22       |OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO    1     1    25.00     25.00
  150   22       |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA    1     2    25.00     50.00
  160   22       |                                                      0     2     0.00     50.00
  170   22       |                                                      0     2     0.00     50.00
  180   22       |                                                      0     2     0.00     50.00
  190   21       |                                                      0     2     0.00     50.00
  200   22       |                                                      0     2     0.00     50.00
  210   22       |                                                      0     2     0.00     50.00
  220   20       |                                                      0     2     0.00     50.00
  230   20       |                                                      0     2     0.00     50.00
  240   22       |                                                      0     2     0.00     50.00
  250   22       |                                                      0     2     0.00     50.00
  260   22       |                                                      0     2     0.00     50.00
  270   20       |                                                      0     2     0.00     50.00
  280   22       |                                                      0     2     0.00     50.00
  290   22       |                                                      0     2     0.00     50.00
  300   22       |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA    1     3    25.00     75.00
  310   22       |                                                      0     3     0.00     75.00
  320   22       |AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA    1     4    25.00    100.00
  330   22       |                                                      0     4     0.00    100.00
  340   22       |                                                      0     4     0.00    100.00
  350   22       |                                                      0     4     0.00    100.00
  360   22       |                                                      0     4     0.00    100.00
  370   22       |                                                      0     4     0.00    100.00
                 ---------------------------------------------------+
                                                                    1

                                  FREQUENCY
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Figure 41. Funnel trap point analysis of amphibians and reptiles on the West Pool site during SY3. Point = location where traps were set; traps = total number of traps set at a sample point.

```
                               FREQUENCY BAR CHART

POINT                                                      FREQ   CUM.   PERCENT     CUM.
                                                                  FREQ             PERCENT
      |
   0  |                                                       0      0      0.00      0.00
  10  |                                                       0      0      0.00      0.00
  20  |SSSSSSSSSSSSSSSSSSSS                                   4      4      5.48      5.48
  30  |LLLLLSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS    10     14     13.70     19.18
  40  |CCCCC                                                  1     15      1.37     20.55
  50  |                                                       0     15      0.00     20.55
  60  |SSSSS                                                  1     16      1.37     21.92
  70  |SSSSS                                                  1     17      1.37     23.29
  80  |SSSSSSSSSS                                             2     19      2.74     26.03
  90  |NNNNNSSSSS                                             2     21      2.74     28.77
 100  |                                                       0     21      0.00     28.77
 110  |NNNNNSSSSSSSSSSSSSSSSSSSS                              5     26      6.85     35.62
 120  |SSSSSSSSSSSSSSS                                        3     29      4.11     39.73
 130  |AAAAALLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLLNNNNNSSSSS  10     39     13.70     53.42
 140  |SSSSS                                                  1     40      1.37     54.79
 150  |SSSSS                                                  1     41      1.37     56.16
 160  |SSSSS                                                  1     42      1.37     57.53
 170  |SSSSSSSSSS                                             2     44      2.74     60.27
 180  |SSSSSSSSSS                                             2     46      2.74     63.01
 190  |                                                       0     46      0.00     63.01
 200  |SSSSSSSSSS                                             2     48      2.74     65.75
 210  |FFFFFNNNNNNNNNNSSSSSSSSSS                              5     53      6.85     72.60
 220  |SSSSS                                                  1     54      1.37     73.97
 230  |AAAAASSSSSSSSSS                                        3     57      4.11     78.08
 240  |NNNNN                                                  1     58      1.37     79.45
 250  |SSSSSSSSSSSSSSS                                        3     61      4.11     83.56
 260  |                                                       0     61      0.00     83.56
 270  |                                                       0     61      0.00     83.56
 280  |NNNNN                                                  1     62      1.37     84.93
 290  |                                                       0     62      0.00     84.93
 300  |FFFFFKKKKKSSSSSSSSSSSSSSSSSSSS                         6     68      8.22     93.15
 310  |                                                       0     68      0.00     93.15
 320  |                                                       0     68      0.00     93.15
 330  |                                                       0     68      0.00     93.15
 340  |                                                       0     68      0.00     93.15
 350  |LLLLL                                                  1     69      1.37     94.52
 360  |CCCCCNNNNNNNNNN                                        3     72      4.11     98.63
 370  |SSSSS                                                  1     73      1.37    100.00
      -----+----+----+----+----+----+----+----+----+----+
           1    2    3    4    5    6    7    8    9    10

                              FREQUENCY
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Figure 42. Herp-patrol point analysis of salamanders and reptiles on the West Pool site during SY1. Point = midpoint of 10-m section of herp-patrol transect.

FREQUENCY BAR CHART

POINT		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0		0	0	0.00	0.00
10		0	0	0.00	0.00
20		0	0	0.00	0.00
30	NNNNN	1	1	2.22	2.22
40		0	1	0.00	2.22
50	FFFFF	1	2	2.22	4.44
60		0	2	0.00	4.44
70		0	2	0.00	4.44
80	OOOOOSSSSSSSSSS	3	5	6.67	11.11
90	SSSSS	1	6	2.22	13.33
100	SSSSSSSSSS	2	8	4.44	17.78
110		0	8	0.00	17.78
120		0	8	0.00	17.78
130		0	8	0.00	17.78
140		0	8	0.00	17.78
150		0	8	0.00	17.78
160		0	8	0.00	17.78
170	SSSSS	1	9	2.22	20.00
180	SSSSSSSSSS	2	11	4.44	24.44
190	OOOOO	1	12	2.22	26.67
200	OOOOOSSSSS	2	14	4.44	31.11
210	SSSSSSSSSSSSSSS	3	17	6.67	37.78
220	SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	7	24	15.56	53.33
230	SSSSSSSSSS	2	26	4.44	57.78
240	SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	10	36	22.22	80.00
250	SSSSS	1	37	2.22	82.22
260		0	37	0.00	82.22
270		0	37	0.00	82.22
280		0	37	0.00	82.22
290	SSSSS	1	38	2.22	84.44
300	SSSSS	1	39	2.22	86.67
310	SSSSSSSSSSSSSSSSSSSS	4	43	8.89	95.56
320		0	43	0.00	95.56
330	WWWWW	1	44	2.22	97.78
340		0	44	0.00	97.78
350		0	44	0.00	97.78
360	SSSSS	1	45	2.22	100.00
370		0	45	0.00	100.00

1 2 3 4 5 6 7 8 9 10

FREQUENCY

Figure 43. Herp-patrol point analysis of salamanders and reptiles on the West Pool site during SY2. Point = midpoint of 10-m section of herp-patrol transect.

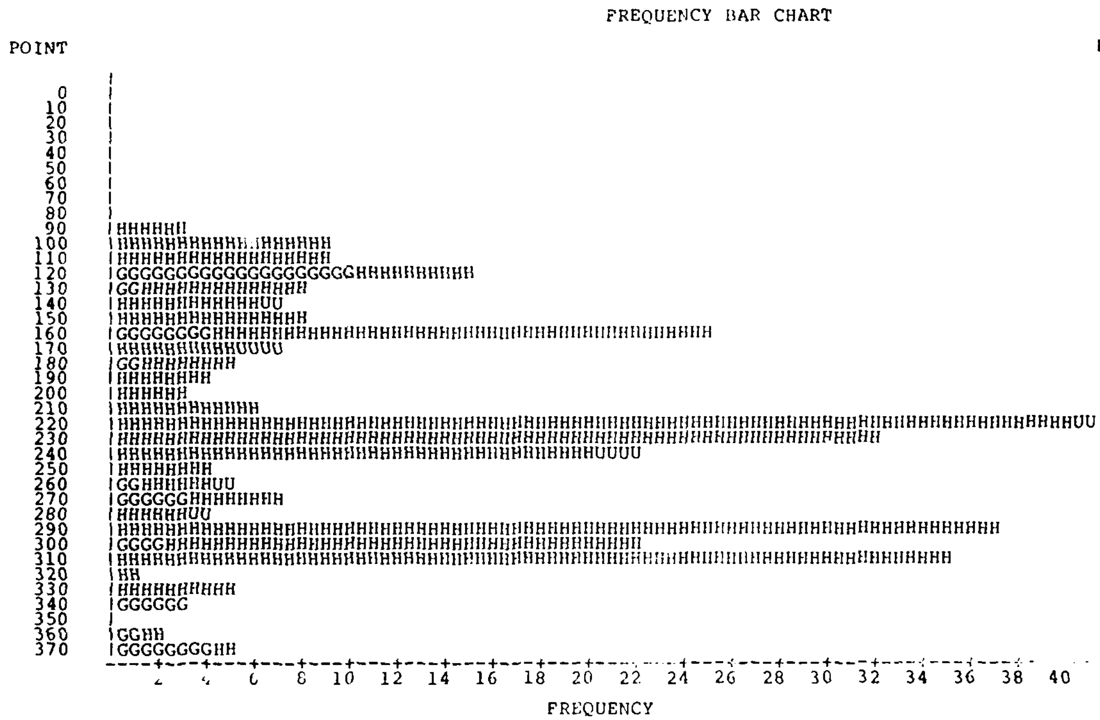
FREQUENCY BAR CHART

POINT		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0		0	0	0.00	0.00
10		0	0	0.00	0.00
20		0	0	0.00	0.00
30		0	0	0.00	0.00
40		0	0	0.00	0.00
50		0	0	0.00	0.00
60		0	0	0.00	0.00
70		0	0	0.00	0.00
80		0	0	0.00	0.00
90		0	0	0.00	0.00
100		0	0	0.00	0.00
110	SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	3	3	14.29	14.29
120	SSSSSSSSSSSSSSSSSSSS	1	4	4.76	19.05
130	OOOOOOOOOOOOOOOOOOOOSSSSSSSSSSSSSSSSSSSS	2	6	9.52	28.57
140	SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	2	8	9.52	38.10
150	CCCCCCCCCCCCCCCCCCCC	1	9	4.76	42.86
160	SSSSSSSSSSSSSSSSSSSS	1	10	4.76	47.62
170		0	10	0.00	47.62
180		0	10	0.00	47.62
190	FFFFFFFFFFFFFFFFFFFFSSSSSSSSSSSSSSSSSSSS	2	12	9.52	57.14
200		0	12	0.00	57.14
210		0	12	0.00	57.14
220		0	12	0.00	57.14
230	SSSSSSSSSSSSSSSSSSSS	1	13	4.76	61.90
240	SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	2	15	9.52	71.43
250	SSSSSSSSSSSSSSSSSSSS	1	16	4.76	76.19
260	SSSSSSSSSSSSSSSSSSSS	1	17	4.76	80.95
270	SSSSSSSSSSSSSSSSSSSS	1	18	4.76	85.71
280	SSSSSSSSSSSSSSSSSSSS	1	19	4.76	90.48
290	SSSSSSSSSSSSSSSSSSSS	1	20	4.76	95.24
300		0	20	0.00	95.24
310		0	20	0.00	95.24
320		0	20	0.00	95.24
330		0	20	0.00	95.24
340		0	20	0.00	95.24
350	SSSSSSSSSSSSSSSSSSSS	1	21	4.76	100.00
360		0	21	0.00	100.00
370		0	21	0.00	100.00

1 2 3

FREQUENCY

Figure 44. Herp-patrol point analysis of salamanders and reptiles on the West Pool site during SY3. Point = midpoint of 10-m section of herp-patrol transect.



POINT	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	0	0	0.00	0.00
10	0	0	0.00	0.00
20	0	0	0.00	0.00
30	0	0	0.00	0.00
40	0	0	0.00	0.00
50	0	0	0.00	0.00
60	0	0	0.00	0.00
70	0	0	0.00	0.00
80	0	0	0.00	0.00
90	3	3	0.90	0.90
100	9	12	2.69	3.59
110	9	21	2.69	6.29
120	15	36	4.49	10.78
130	8	44	2.40	13.17
140	7	51	2.10	15.27
150	8	59	2.40	17.66
160	25	84	7.49	25.15
170	7	91	2.10	27.25
180	5	96	1.50	28.74
190	4	100	1.20	29.94
200	3	103	0.90	30.84
210	6	109	1.80	32.63
220	41	150	12.28	44.91
230	32	182	9.58	54.49
240	22	204	6.59	61.08
250	4	208	1.20	62.28
260	5	213	1.50	63.77
270	7	220	2.10	65.87
280	4	224	1.20	67.07
290	37	261	11.08	78.14
300	22	283	6.59	84.73
310	35	318	10.48	95.21
320	1	319	0.30	95.51
330	5	324	1.50	97.01
340	3	327	0.90	97.90
350	0	327	0.00	97.90
360	2	329	0.60	98.50
370	5	334	1.50	100.00

Figure 45. Herp-patrol point analysis of calling frogs on the West Pool site during SY1. Point = midpoint of 10-m section of herp-patrol transect.

FREQUENCY BAR CHART

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POINT                                                                FREQ  CUM.   PERCENT    CUM.
                                                                           FREQ              PERCENT
         |
    0    |GG                                                            1     1     0.22      0.22
   10    |                                                              0     1     0.00      0.22
   20    |                                                              0     1     0.00      0.22
   30    |                                                              0     1     0.00      0.22
   40    |                                                              0     1     0.00      0.22
   50    |                                                              0     1     0.00      0.22
   60    |                                                              0     1     0.00      0.22
   70    |GGHHHHUUUUUU                                                  6     7     1.33      1.55
   80    |                                                              0     7     0.00      1.55
   90    |HHHHHHHHHHHHHHHHHHHHHHRRRRUU                                 14    21     3.10      4.65
  100    |HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHUU             24    45     5.31      9.96
  110    |HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHRRRRUU 30    75     6.64     16.59
  120    |GGGGHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHRR         26   101     5.75     22.35
  130    |HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHYYYY 31   132     6.86     29.20
  140    |HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHRRRRRRUU                     20   152     4.42     33.63
  150    |GGHHHHHHHHHHHHHHHHHHHH                                       11   163     2.43     36.06
  160    |GGGGGGGGHHHHHHHHHHUU                                         10   173     2.21     38.27
  170    |GGGGGGGGGGHHHHHHHHHHHHHHHHHHHHHHHHHHHHRRUU                   21   194     4.65     42.92
  180    |HHHHHHHHHHHHHHHHHHHHHHHHHHHHUUUU                             16   210     3.54     46.46
  190    |HHHHHHHHHHHHHHHHHHHHHHHHHHRRRRUUUU                           17   227     3.76     50.22
  200    |HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHRRUU                         18   245     3.98     54.20
  210    |GGHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHUUUUUU                     20   265     4.42     58.63
  220    |GGGGGGHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHUU                       19   284     4.20     62.83
  230    |GGGGGGGGGGHHHHHHHHHHHHHHHHHHHHRR                             16   300     3.54     66.37
  240    |GGGGGGGGGGGGGGHHHHHHHHHHHHHHHHUU                             16   316     3.54     69.91
  250    |HHHHHHHHHHUU                                                  6   322     1.33     71.24
  260    |HHHHHHHHHHHHHHHHHHRR                                         10   332     2.21     73.45
  270    |GGHHHHHHHHHHHHHHHHHHHHHH                                     12   344     2.65     76.11
  280    |GGGGHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHUU                       19   363     4.20     80.31
  290    |HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHRRUU                           17   380     3.76     84.07
  300    |GGHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHRR                 22   402     4.87     88.94
  310    |HHHHHHHHHHHHHHHHHHHHRRUU                                     12   414     2.65     91.59
  320    |HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH                           17   431     3.76     95.35
  330    |HHHHHHHHHHHH                                                  6   437     1.33     96.68
  340    |GGHHHHHHHHHHUUUU                                              8   445     1.77     98.45
  350    |GGGG                                                          2   447     0.44     98.89
  360    |HHHHHH                                                        3   450     0.66     99.56
  370    |GGGG                                                          2   452     0.44    100.00
         ----+---+---+---+---+---+---+---+---+---+---+---+---+---+---+--
             2   4   6   8  10  12  14  16  18  20  22  24  26  28  30

                                 FREQUENCY
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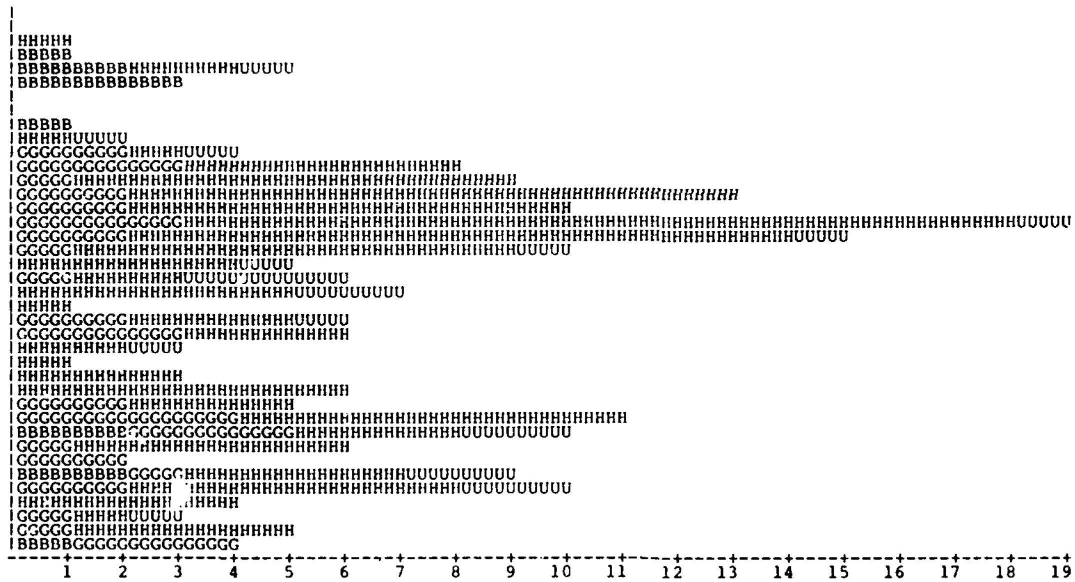
Figure 46. Herp-patrol point analysis of calling frogs on the West Pool site during SY2. Point = midpoint of 10-m section of herp-patrol transect.

FREQUENCY BAR CHART



POINT	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	0	0	0.00	0.00
10	1	1	0.47	0.47
20	1	2	0.47	0.93
30	5	7	2.34	3.27
40	3	10	1.40	4.67
50	0	10	0.00	4.67
60	0	10	0.00	4.67
70	1	11	0.47	5.14
80	2	13	0.93	6.07
90	4	17	1.87	7.94
100	8	25	3.74	11.68
110	9	34	4.21	15.89
120	13	47	6.07	21.96
130	10	57	4.67	26.64
140	19	76	8.88	35.51
150	15	91	7.01	42.52
160	10	101	4.67	47.20
170	5	106	2.34	49.53
180	6	112	2.80	52.34
190	7	119	3.27	55.61
200	1	120	0.47	56.07
210	6	126	2.80	58.88
220	6	132	2.80	61.68
230	3	135	1.40	63.08
240	1	136	0.47	63.55
250	3	139	1.40	64.95
260	6	145	2.80	67.76
270	5	150	2.34	70.09
280	11	161	5.14	75.23
290	10	171	4.67	79.91
300	6	177	2.80	82.71
310	2	179	0.93	83.64
320	9	188	4.21	87.85
330	10	198	4.67	92.52
340	4	202	1.87	94.39
350	3	205	1.40	95.79
360	5	210	2.34	98.13
370	4	214	1.87	100.00

Figure 47. Herp-patrol point analysis of calling frogs on the West Pool site during SY3. Point = midpoint of 10-m section of herp-patrol transect.

FREQUENCY BAR CHART

TRIP	TRAPS		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
04 AUG 77	13		0	0	0.00	0.00
01 SEP 77	13	LLLLLLLLLL	2	2	1.82	1.82
30 SEP 77	13	AAAAALLLLL	2	4	1.82	3.64
4 NOV 77	13	AAAAAAAAAAAAAAA	3	7	2.73	6.36
7 DEC 77	21		0	7	0.00	6.36
22 DEC 77	21		0	7	0.00	6.36
11 JAN 78	20		0	7	0.00	6.36
29 JAN 78	21		0	7	0.00	6.36
14 FEB 78	21		0	7	0.00	6.36
28 FEB 78	21		0	7	0.00	6.36
21 MAR 78	24		0	7	0.00	6.36
29 MAR 78	27	AAAAA	1	8	0.91	7.27
12 APR 78	27	AAAAAAAAAA	2	10	1.82	9.09
24 APR 78	26		0	10	0.00	9.09
8 MAY 78	27		0	10	0.00	9.09
24 MAY 78	28	AAAAAAAAAAAAAAAAAAAALLLLLLLLLL	6	16	5.45	14.55
20 JUN 78	30	AAAAAAAAAAAAAAA	3	19	2.73	17.27
27 JUN 78	32	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	8	27	7.27	24.55
10 JUL 78	37	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	13	40	11.82	36.36
27 JUL 78	37	AAAAAAAAAA	2	42	1.82	38.18
15 AUG 78	37	AAAAAAAAAAAAAAAAAAAAAAAAA	5	47	4.55	42.73
31 AUG 78	37	$$$$$AAAAAAAAAAAAAAAAAAAALLLLLLLLLLSSSSS	8	55	7.27	50.00
13 SEP 78	37	AAAAAAAAAAAAAAAAAAAAAAAAALLLLLLLLLLSSSSSSSSSS	9	64	8.18	58.18
29 SEP 78	37	AAAAALLLLLUUUUU	3	67	2.73	60.91
14 OCT 78	37	AAAAAAAAAAAAAAALLLLLLLLLLOOOOO	6	73	5.45	66.36
02 NOV 78	36	AAAAALLLLLNNNNNWWWWW	4	77	3.64	70.00
17 NOV 78	37	AAAAAAAAAAAAAAAAAAAAAAAAAWWWWW	6	83	5.45	75.45
30 NOV 78	37	AAAAAAAAAAAAAAAAAAAA	4	87	3.64	79.09
15 DEC 78	37		0	87	0.00	79.09
12 JAN 79	37	LLLLLLLLLL	2	89	1.82	80.91
19 JAN 79	37		0	89	0.00	80.91
02 FEB 79	37	HHHHH	1	90	0.91	81.82
17 FEB 79	37	AAAAAAAAAA	2	92	1.82	83.64
02 MAR 79	37		0	92	0.00	83.64
06 APR 79	37	&&&&&AAAAA	2	94	1.82	85.45
20 APR 79	37	LLLLLSSSSS	2	96	1.82	87.27
11 MAY 79	37		0	96	0.00	87.27
25 MAY 79	37	AAAAALLLLL	2	98	1.82	89.09
14 JUN 79	37	SSSSS	1	99	0.91	90.00
27 JUN 79	37	AAAAAAAAAA	2	101	1.82	91.82
10 JUL 79	36	&&&&&AAAAAGGGGG	3	104	2.73	94.55
25 JUL 79	37		0	104	0.00	94.55
23 AUG 79	36	AAAAA	1	105	0.91	95.45
30 AUG 79	32	AAAAA	1	106	0.91	96.36
12 SEP 79	36		0	106	0.00	96.36
26 SEP 79	32		0	106	0.00	96.36
27 OCT 79	68		0	106	0.00	96.36
20 NOV 79	74		0	106	0.00	96.36
19 DEC 79	74		0	106	0.00	96.36
02 FEB 80	74	AAAAA	1	107	0.91	97.27
23 FEB 80	74		0	107	0.00	97.27
22 MAR 80	74		0	107	0.00	97.27
26 APR 80	74	AAAAA	1	108	0.91	98.18
31 MAY 80	74		0	108	0.00	98.18
28 JUN 80	74	AAAAA	1	109	0.91	99.09
25 JUL 80	74		0	109	0.00	99.09
29 AUG 80	74	OOOOO	1	110	0.91	100.00
17 SEP 80	74		0	110	0.00	100.00

1 2 3 4 5 6 7 8 9 10 11 12 13

FREQUENCY

Figure 48. Funnel trap trip analysis of amphibians and reptiles on the West Pool site. Trip = date of trapping; traps = total number of traps set on a date.

FREQUENCY BAR CHART

TRIP	MINUTES		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
04 AUG 77		KKSS	2	2	1.44	1.44
01 SEP 77		AALLLLLLLLLLLLLLNN	9	11	6.47	7.91
08 SEP 77		CCNNSS	3	14	2.16	10.07
22 SEP 77		SSSSSSSSSS	5	19	3.60	13.67
29 SEP 77		SSSSSSSSSSSSSSSSSSSS	10	29	7.19	20.86
20 OCT 77	15	SSSS	2	31	1.44	22.30
03 NOV 77	20	SSSS	2	33	1.44	23.74
16 NOV 77	28	SSSSSSSSSS	5	38	3.60	27.34
7 DEC 77	13		0	38	0.00	27.34
14 DEC 77	23		0	38	0.00	27.34
22 DEC 77	20	SS	1	39	0.72	28.06
11 JAN 78	18		0	39	0.00	28.06
29 JAN 78	11	SS	1	40	0.72	28.78
14 FEB 78	20	SSSSSS	3	43	2.16	30.94
28 FEB 78	59	LLSSSSSS	4	47	2.88	33.81
21 MAR 78	71	NNNNNNNNSSSSSSSSSSSSSSSSSSSS	14	61	10.07	43.88
28 MAR 78	50	LLSSSSSS	4	65	2.88	46.76
11 APR 78	42	SS	1	66	0.72	47.48
24 APR 78	33		0	66	0.00	47.48
8 MAY 78	57	AAFF	2	68	1.44	48.92
23 MAY 78	51	NN	1	69	0.72	49.64
19 JUN 78	40		0	69	0.00	49.64
27 JUN 78	38	FF	1	70	0.72	50.36
10 JUL 78	46		0	70	0.00	50.36
27 JUL 78	49	CC	1	71	0.72	51.08
14 AUG 78	45		0	71	0.00	51.08
31 AUG 78	39		0	71	0.00	51.08
13 SEP 78	38		0	71	0.00	51.08
29 SEP 78	37	NNNN	2	73	1.44	52.52
14 OCT 78	42		0	73	0.00	52.52
10 NOV 78	39	OO	1	74	0.72	53.24
18 NOV 78	19		0	74	0.00	53.24
01 DEC 78	29		0	74	0.00	53.24
15 DEC 78	32		0	74	0.00	53.24
12 JAN 79	33	OOOOSSSSSS	5	79	3.60	56.83
19 JAN 79	27	SSSS	2	81	1.44	58.27
02 FEB 79	34	SSSS	2	83	1.44	59.71
17 FEB 79	28	SS	1	84	0.72	60.43
03 MAR 79	49	SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSWW	28	112	20.14	80.58
14 MAR 79	26	FFSS	2	114	1.44	82.01
06 APR 79	32	NN	1	115	0.72	82.73
20 APR 79	29	SSSS	2	117	1.44	84.17
11 MAY 79	25		0	117	0.00	84.17
25 MAY 79	29		0	117	0.00	84.17
12 JUN 79	28		0	117	0.00	84.17
25 JUN 79	28	SS	1	118	0.72	84.89
10 JUL 79	29		0	118	0.00	84.89
24 JUL 79	37		0	118	0.00	84.89
22 AUG 79	34		0	118	0.00	84.89
28 AUG 79	42		0	118	0.00	84.89
12 SEP 79	29		0	118	0.00	84.89
24 SEP 79	29		0	118	0.00	84.89
13 OCT 79	26		0	118	0.00	84.89
26 OCT 79	24		0	118	0.00	84.89
06 NOV 79	39	SS	1	119	0.72	85.61
19 NOV 79	24		0	119	0.00	85.61
05 DEC 79	34		0	119	0.00	85.61
18 DEC 79	21	SS	1	120	0.72	86.33
11 JAN 80	39	CCFFSSSSSSSS	6	126	4.32	90.65
01 FEB 80	26		0	126	0.00	90.65
08 FEB 80	32	OOSSSSSSSSSSSS	7	133	5.04	95.68
23 FEB 80	17		0	133	0.00	95.68
07 MAR 80	33	SSSS	2	135	1.44	97.12
21 MAR 80	23		0	135	0.00	97.12
11 APR 80	27		0	135	0.00	97.12
25 APR 80	31	SSSS	2	137	1.44	98.56
09 MAY 80	22		0	137	0.00	98.56
30 MAY 80	21		0	137	0.00	98.56
13 JUN 80	21		0	137	0.00	98.56
27 JUN 80	24		0	137	0.00	98.56
23 JUL 80	20		0	137	0.00	98.56
31 JUL 80	24		0	137	0.00	98.56
14 AUG 80	21		0	137	0.00	98.56
28 AUG 80	21	SS	1	138	0.72	99.28
04 SEP 80	24	SS	1	139	0.72	100.00
17 SEP 80	19		0	139	0.00	100.00
		2 4 6 8 10 12 14 16 18 20 22 24 26 28				
		FREQUENCY				

Figure 49. Herp-patrol trip analysis of salamanders and reptiles on the West Pool site. Trip = date of herp-patrol; minutes = total sampling time of a herp-patrol on a date (time not recorded prior to 13 October 1977).

FREQUENCY BAR CHART

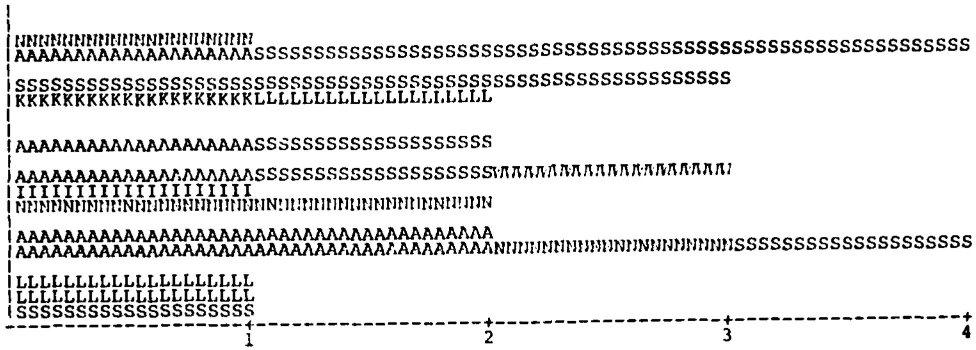
TRIP	MINUTES		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
20 OCT 77	15		0	0	0.00	0.00
3 NOV 77	20		0	0	0.00	0.00
16 NOV 77	28		0	0	0.00	0.00
7 DEC 77	13		0	0	0.00	0.00
14 DEC 77	12		0	0	0.00	0.00
22 DEC 77	14		0	0	0.00	0.00
12 JAN 78	8		0	0	0.00	0.00
30 JAN 78	5		0	0	0.00	0.00
14 FEB 78	9		0	0	0.00	0.00
28 FEB 78	28		0	0	0.00	0.00
21 MAR 78	42	H	1	1	0.10	0.10
28 MAR 78	33	U	2	3	0.20	0.30
11 APR 78	22	HHHHU	9	12	0.90	1.20
24 APR 78	16	HU	2	14	0.20	1.40
8 MAY 78	32	GGGGGHHHHHHHHHHHHHHHHH	40	54	4.00	5.40
23 MAY 78	24		0	54	0.00	5.40
19 JUN 78	22	HU	4	58	0.40	5.80
27 JUN 78	20		0	58	0.00	5.80
10 JUL 78	26	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHU	135	193	13.50	19.30
27 JUL 78	23	GGGHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH	66	259	6.60	25.90
14 AUG 78	26	GGGGGGGHHHHHHHHHHHHHHHHHHHHHHHHHH	57	316	5.70	31.60
31 AUG 78	19	GHHHHHHHH	16	332	1.60	33.20
13 SEP 78	21	H	2	334	0.20	33.40
29 SEP 78	21		0	334	0.00	33.40
14 OCT 78	22	U	1	335	0.10	33.50
10 NOV 78	20		0	335	0.00	33.50
18 NOV 78	13		0	335	0.00	33.50
1 DEC 78	16		0	335	0.00	33.50
15 DEC 78	19		0	335	0.00	33.50
12 JAN 79	18	U	1	336	0.10	33.60
19 JAN 79	13	UU	3	339	0.30	33.90
2 FEB 79	18		0	339	0.00	33.90
17 FEB 79	15	U	1	340	0.10	34.00
3 MAR 79	19	UUU	6	346	0.60	34.60
14 MAR 79	20	UUU	6	352	0.60	35.20
6 APR 79	16	UU	3	355	0.30	35.50
20 APR 79	18	HR	3	358	0.30	35.80
11 MAY 79	16	GGGGHH	10	368	1.00	36.80
25 MAY 79	18	U	2	370	0.20	37.00
12 JUN 79	18		0	370	0.00	37.00
25 JUN 79	17	GGGGHHHHHHHHHU	25	395	2.50	39.50
10 JUL 79	22	GGGGGHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHRRRR	74	469	7.40	46.90
24 JUL 79	22	GGGGGHHHHHHHHHHHHHHHHHHHHHHHRRY	55	524	5.50	52.40
22 AUG 79	16	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHH	134	658	13.40	65.80
28 AUG 79	36	GHHHHHHHHHHHHHHHHHHHHHHR	43	701	4.30	70.10
12 SEP 79	15	GHHHHHHHHHHHHHHHHHHHHHHHHHHHHHRR	55	756	5.50	75.60
24 SEP 79	17	GGHHHHHHHHHHHHHHHH	30	786	3.00	78.60
13 OCT 70			0	786	0.00	78.60
26 OCT 79	16		0	786	0.00	78.60
6 NOV 79	25		0	786	0.00	78.60
19 NOV 79	13	U	1	787	0.10	78.70
5 DEC 79	21	U	1	788	0.10	78.80
18 DEC 79	12		0	788	0.00	78.80
11 JAN 80	23	UUUUUU	11	799	1.10	79.90
1 FEB 80	15	U	1	800	0.10	80.00
8 FEB 80	20		0	800	0.00	80.00
23 FEB 80	9	U	1	801	0.10	80.10
7 MAR 80	18	UU	4	805	0.40	80.50
21 MAR 80	13		0	805	0.00	80.50
11 APR 80	17	U	1	806	0.10	80.60
25 APR 80	17	HH	3	809	0.30	80.90
9 MAY 80	13	BBBBBB	12	821	1.20	82.10
30 MAY 80	14	HHHHHHHHHHHHHHHHHHHHHHHHHHHU	48	869	4.80	86.90
13 JUN 80	12	HHHHHHHHHHHHHHHHHHHHHH	39	908	3.90	90.80
27 JUN 80	15	GGHHHHHHHHHHHHH	27	935	2.70	93.50
23 JUL 80	11	HHHHH	10	945	1.00	94.50
31 JUL 80	15	HHHH	7	952	0.70	95.20
14 AUG 80	14	G	2	954	0.20	95.40
28 AUG 80	13		0	954	0.00	95.40
4 SEP 80	15	GGGGGGGGGGGGGHHHH	34	988	3.40	98.80
17 SEP 80	11	GGGGGHH	12	1000	1.20	100.00

10 20 30 40 50 60 70 80 90 100 110 120 130

FREQUENCY

Figure 50. Herp-patrol trip analysis of calling frogs on the West Pool site. Trip = date of herp-patrol; minutes = total sampling time of a herp-patrol on a date (time not recorded prior to 13 October 1977).

FREQUENCY BAR CHART



POINT	TRAPS	FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0	21	0	0	0.00	0.00
10	21	1	1	3.70	3.70
20	21	4	5	14.81	18.52
30	21	0	5	0.00	18.52
40	21	3	8	11.11	29.63
1050	21	2	10	7.41	37.04
1060	21	0	10	0.00	37.04
1070	21	0	10	0.00	37.04
1080	21	2	12	7.41	44.44
1090	21	0	12	0.00	44.44
1100	21	3	15	11.11	55.56
1110	21	1	16	3.70	59.26
1120	21	2	18	7.41	66.67
1130	21	0	18	0.00	66.67
1140	21	2	20	7.41	74.07
1150	21	4	24	14.81	88.89
1160	21	0	24	0.00	88.89
1170	21	1	25	3.70	92.59
1180	21	1	26	3.70	96.30
1190	21	1	27	3.70	100.00

Figure 51. Funnel trap point analysis of amphibians and reptiles on the Gatlin Canal site during SY1. Point = location where traps were set; traps = total number of traps set at a sample point.

```
                              FREQUENCY BAR CHART

POINT TRAPS                                                    FREQ  CUM.   PERCENT    CUM.
                                                                     FREQ             PERCENT
          |
   0  23  |                                                       0     0     0.00      0.00
  10  23  |++++++++++++++++++++LLLLLLLLLLRRRRRRRRRRRRRRRRRRRR      5     5    13.89     13.89
  20  23  |AAAAAAAAAAAAAAAAAAAASSSSSSSSSS                          3     8     8.33     22.22
  30  23  |&&&&&&&&&&                                              1     9     2.78     25.00
  40  23  |SSSSSSSSSS                                              1    10     2.78     27.78
  50  16  |                                                        0    10     0.00     27.78
  60  16  |                                                        0    10     0.00     27.78
  70  16  |                                                        0    10     0.00     27.78
  80  15  |LLLLLLLLLLSSSSSSSSSSSSSSSSSSSS                          3    13     8.33     36.11
  90  16  |                                                        0    13     0.00     36.11
 100  16  |UUUUUUUUUU                                              1    14     2.78     38.89
 110  16  |OOOOOOOOOOSSSSSSSSSS                                    2    16     5.56     44.44
 120  16  |&&&&&&&&&&OOOOOOOOOO                                    2    18     5.56     50.00
 130  16  |AAAAAAAAAA                                              1    19     2.78     52.78
 140  16  |KKKKKKKKKK                                              1    20     2.78     55.56
 150  16  |                                                        0    20     0.00     55.56
 160  16  |                                                        0    20     0.00     55.56
 170  16  |IIIIIIIIIILLLLLLLLLL                                    2    22     5.56     61.11
 180  15  |                                                        0    22     0.00     61.11
 190  15  |OOOOOOOOOO                                              1    23     2.78     63.89
1050   7  |OOOOOOOOOOUUUUUUUUUU                                    2    25     5.56     69.44
1060   7  |RRRRRRRRRR                                              1    26     2.78     72.22
1070   7  |AAAAAAAAAA                                              1    27     2.78     75.00
1080   7  |                                                        0    27     0.00     75.00
1090   7  |                                                        0    27     0.00     75.00
1100   7  |SSSSSSSSSS                                              1    28     2.78     77.78
1110   7  |                                                        0    28     0.00     77.78
1120   7  |                                                        0    28     0.00     77.78
1130   7  |NNNNNNNNNNNNNNNNNNNNSSSSSSSSSSSSSSSSSSSS                4    32    11.11     88.89
1140   7  |                                                        0    32     0.00     88.89
1150   7  |OOOOOOOOOO                                              1    33     2.78     91.67
1160   7  |AAAAAAAAAA                                              1    34     2.78     94.44
1170   7  |++++++++++                                              1    35     2.78     97.22
1180   7  |AAAAAAAAAA                                              1    36     2.78    100.00
1190   7  |                                                        0    36     0.00    100.00
          ----------+---------+---------+---------+---------+
                    1         2         3         4         5

                              FREQUENCY
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Figure 52. Funnel trap point analysis of amphibians and reptiles on the Gatlin Canal site during SY2. Point = location where traps were set; traps = total number of traps set at a sample point.

```
                                     FREQUENCY BAR CHART
                                                                                                   CUM.
POINT TRAPS                                                                FREQ   CUM.   PERCENT   PERCENT
                                                                                  FREQ
        |
  0  22 |RRRRRRRRRRRRRRRRRRRR                                                  1     1     5.88      5.88
 10  22 |LLLLLLLLLLLLLLLLLLLL                                                  1     2     5.88     11.76
 20  22 |++++++++++++++++++++SSSSSSSSSSSSSSSSSSSS                              2     4    11.76     23.53
 30  22 |RRRRRRRRRRRRRRRRRRRR                                                  1     5     5.88     29.41
 40  22 |                                                                      0     5     0.00     29.41
 50  22 |NNNNNNNNNNNNNNNNNNNN                                                  1     6     5.88     35.29
 60  22 |                                                                      0     6     0.00     35.29
 70  22 |                                                                      0     6     0.00     35.29
 80  22 |                                                                      0     6     0.00     35.29
 90  22 |SSSSSSSSSSSSSSSSSSSS                                                  1     7     5.88     41.18
100  22 |++++++++++++++++++++AAAAAAAAAAAAAAAAAAAA                              2     9    11.76     52.94
110  22 |                                                                      0     9     0.00     52.94
120  22 |                                                                      0     9     0.00     52.94
130  22 |WWWWWWWWWWWWWWWWWWWW                                                  1    10     5.88     58.82
140  22 |AAAAAAAAAAAAAAAAAAAA                                                  1    11     5.88     64.71
150  22 |SSSSSSSSSSSSSSSSSSSS                                                  1    12     5.88     70.59
160  22 |++++++++++++++++++++++++++++++++++++++++&&&&&&&&&&&&&&&&&&&&          3    15    17.65     88.24
170  22 |                                                                      0    15     0.00     88.24
180  22 |IIIIIIIIIIIIIIIIIIII                                                  1    16     5.88     94.12
190  22 |RRRRRRRRRRRRRRRRRRRR                                                  1    17     5.88    100.00
        --------------------+-------------------+-------------------+
                            1                   2                   3

                                 FREQUENCY
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Figure 53. Funnel trap chart analysis of amphibians and reptiles on the Gatlin Canal site during SY3. Point = location where traps were set; traps = total number of traps set at a sample point.

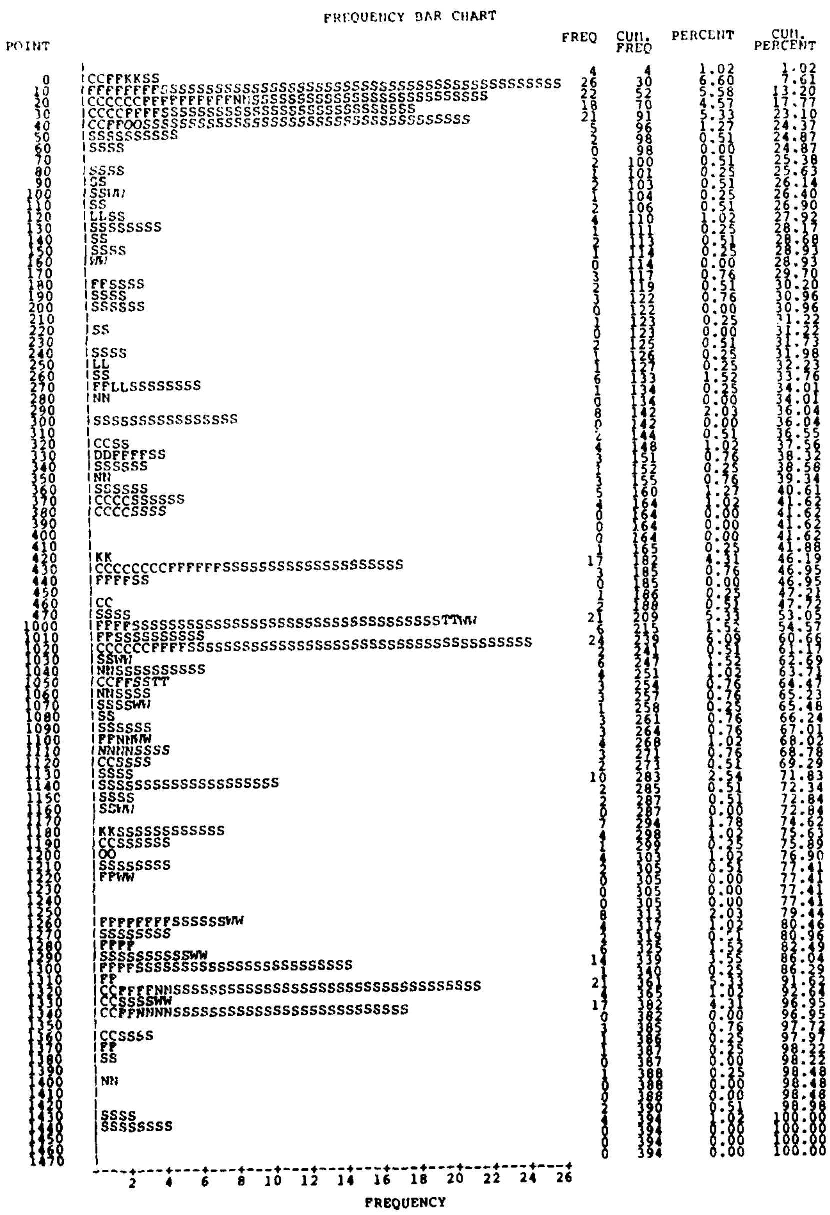

Figure 54. Herp-patrol point analysis of salamanders and reptiles on the Gatlin Canal site during SY1. Point = midpoint of 10-m section of herp-patrol transect.

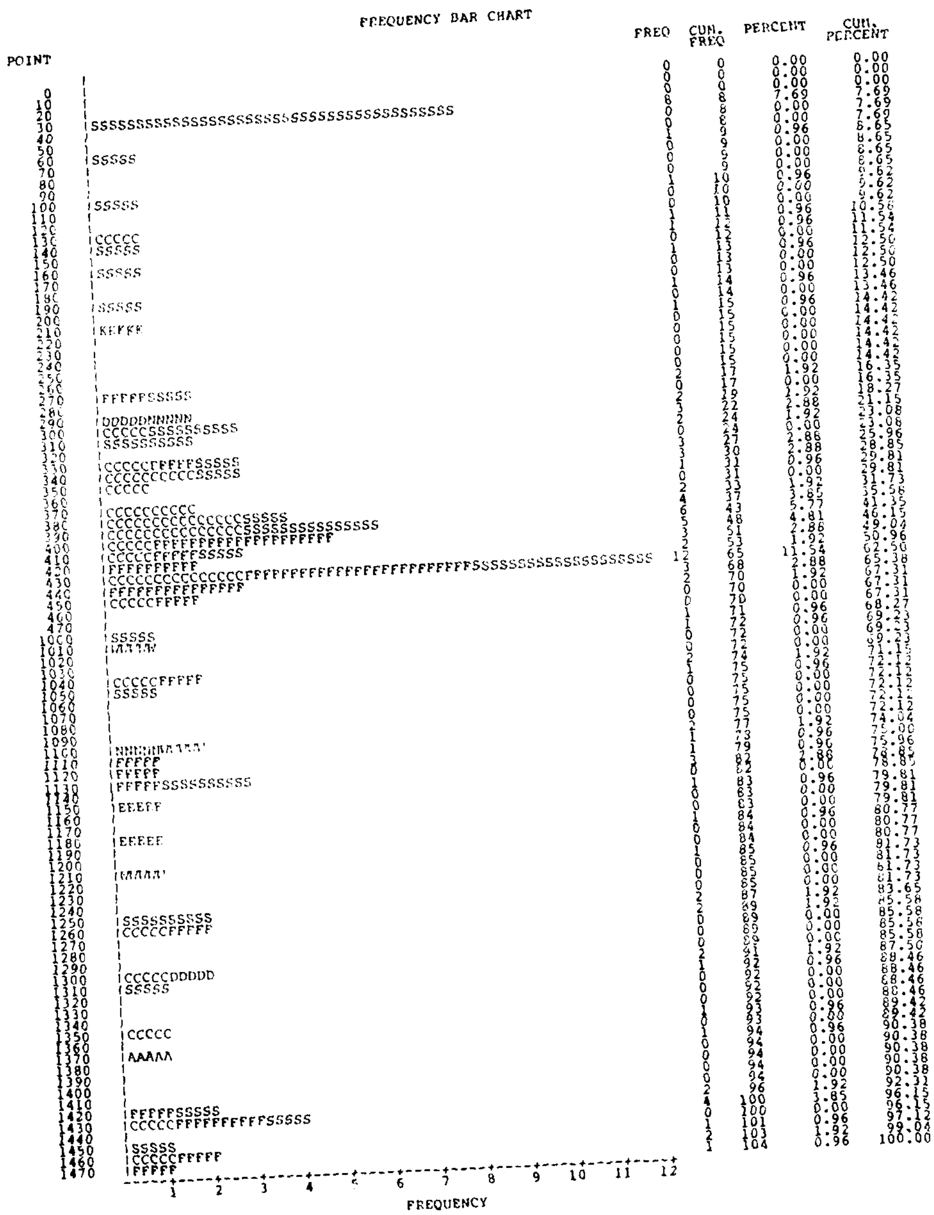

Figure 55. Herp-patrol point analysis of salamanders and reptiles on the Gatlin Canal site during SY2. Point = midpoint of 10-m section of herp-patrol transect.

FREQUENCY BAR CHART

POINT		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
0		0	0	0.00	0.00
10	SSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	2	2	4.65	4.65
20		0	2	0.00	4.65
30		0	2	0.00	4.65
40		0	2	0.00	4.65
50	FFFFFFFFFFFFFFFFFFFF	1	3	2.33	6.98
60		0	3	0.00	6.98
70	LLLLLLLLLLLLLLLLLLLL	1	4	2.33	9.30
80		0	4	0.00	9.30
90	FFFFFFFFFFFFFFFFFFFF	1	5	2.33	11.63
100		0	5	0.00	11.63
110	CCCCCCCCCCCCCCCCCCCCLLLLLLLLLLLLLLLLLLLL	2	7	4.65	16.28
120		0	7	0.00	16.28
130		0	7	0.00	16.28
140		0	7	0.00	16.28
150		0	7	0.00	16.28
160	TTTTTTTTTTTTTTTTTTTT	1	8	2.33	18.60
170		0	8	0.00	18.60
180		0	8	0.00	18.60
190		0	8	0.00	18.60
200		0	8	0.00	18.60
210	SSSSSSSSSSSSSSSSSSSS	1	9	2.33	20.93
220		0	9	0.00	20.93
230		0	9	0.00	20.93
240		0	9	0.00	20.93
250	SSSSSSSSSSSSSSSSSSSS	1	10	2.33	23.26
260	SSSSSSSSSSSSSSSSSSSS	1	11	2.33	25.58
270	AAAAAAAAAAAAAAAAAAAA	1	12	2.33	27.91
280		0	12	0.00	27.91
290	CCCCCCCCCCCCCCCCCCCC	1	13	2.33	30.23
300	CCCCCCCCCCCCCCCCCCCCSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	3	16	6.98	37.21
310		0	16	0.00	37.21
320	FFFFFFFFFFFFFFFFFFFF	1	17	2.33	39.53
330	SSSSSSSSSSSSSSSSSSSS	1	18	2.33	41.86
340	CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC	2	20	4.65	46.51
350		0	20	0.00	46.51
360	CCCCCCCCCCCCCCCCCCCCFFFFFFFFFFFFFFFFFFFF	2	22	4.65	51.16
370		0	22	0.00	51.16
380		0	22	0.00	51.16
390		0	22	0.00	51.16
400		0	22	0.00	51.16
410	FFFFFFFFFFFFFFFFFFFF	1	23	2.33	53.49
420		0	23	0.00	53.49
430	CCCCCCCCCCCCCCCCCCCCFFFFFFFFFFFFFFFFFFFFSSSSSSSSSSSSSSSSSSSS	3	26	6.98	60.47
440		0	26	0.00	60.47
450	CCCCCCCCCCCCCCCCCCCCFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	4	30	9.30	69.77
460		0	30	0.00	69.77
470	FFFFFFFFFFFFFFFFFFFF	1	31	2.33	72.09
1000		0	31	0.00	72.09
1010		0	31	0.00	72.09
1020		0	31	0.00	72.09
1030		0	31	0.00	72.09
1040		0	31	0.00	72.09
1050		0	31	0.00	72.09
1060		0	31	0.00	72.09
1070		0	31	0.00	72.09
1080		0	31	0.00	72.09
1090		0	31	0.00	72.09
1100		0	31	0.00	72.09
1110		0	31	0.00	72.09
1120		0	31	0.00	72.09
1130		0	31	0.00	72.09
1140	SSSSSSSSSSSSSSSSSSSS	1	32	2.33	74.42
1150	SSSSSSSSSSSSSSSSSSSS	1	33	2.33	76.74
1160		0	33	0.00	76.74
1170	SSSSSSSSSSSSSSSSSSSS	1	34	2.33	79.07
1180		0	34	0.00	79.07
1190		0	34	0.00	79.07
1200		0	34	0.00	79.07
1210		0	34	0.00	79.07
1220		0	34	0.00	79.07
1230		0	34	0.00	79.07
1240	CCCCCCCCCCCCCCCCCCCC	1	35	2.33	81.40
1250		0	35	0.00	81.40
1260	FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	2	37	4.65	86.05
1270		0	37	0.00	86.05
1280		0	37	0.00	86.05
1290		0	37	0.00	86.05
1300		0	37	0.00	86.05
1310		0	37	0.00	86.05
1320		0	37	0.00	86.05
1330		0	37	0.00	86.05
1340		0	37	0.00	86.05
1350		0	37	0.00	86.05
1360		0	37	0.00	86.05
1370		0	37	0.00	86.05
1380		0	37	0.00	86.05
1390		0	37	0.00	86.05
1400	SSSSSSSSSSSSSSSSSSSS	1	38	2.33	88.37
1410		0	38	0.00	88.37
1420	FFFFFFFFFFFFFFFFFFFF	1	39	2.33	90.70
1430		0	39	0.00	90.70
1440	FFFFFFFFFFFFFFFFFFFF	1	40	2.33	93.02
1450	FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	3	43	6.98	100.00
1460		0	43	0.00	100.00
1470		0	43	0.00	100.00

1 2 3 4

FREQUENCY

Figure 56. Herp-patrol point analysis of salamanders and reptiles on the Gatlin Canal site during SY3. Point = midpoint of 10-m section of herp-patrol transect.

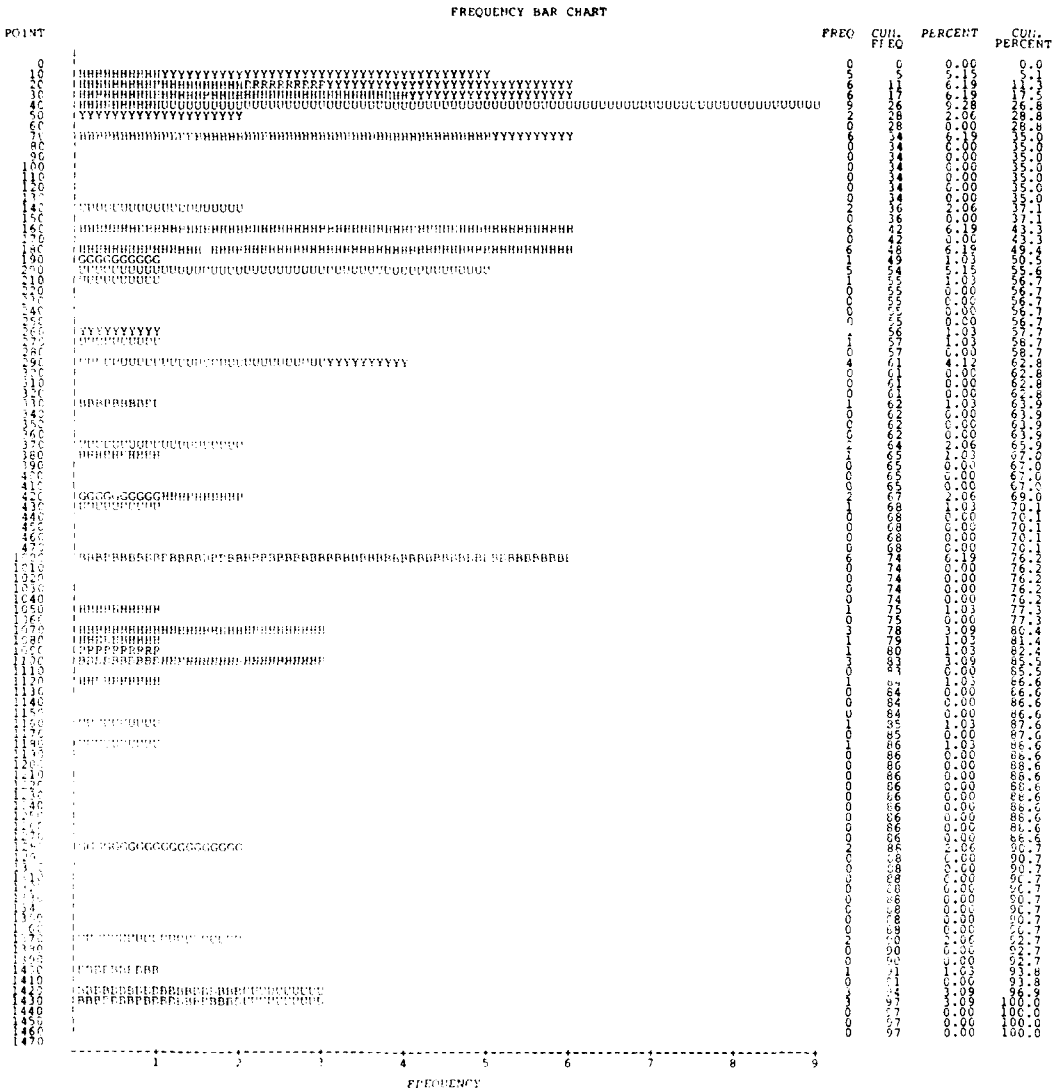

Figure 57. Herp-patrol point analysis of calling frogs on the Gatlin Canal site during SY1. Point = midpoint of 10-m section of herp-patrol transect.

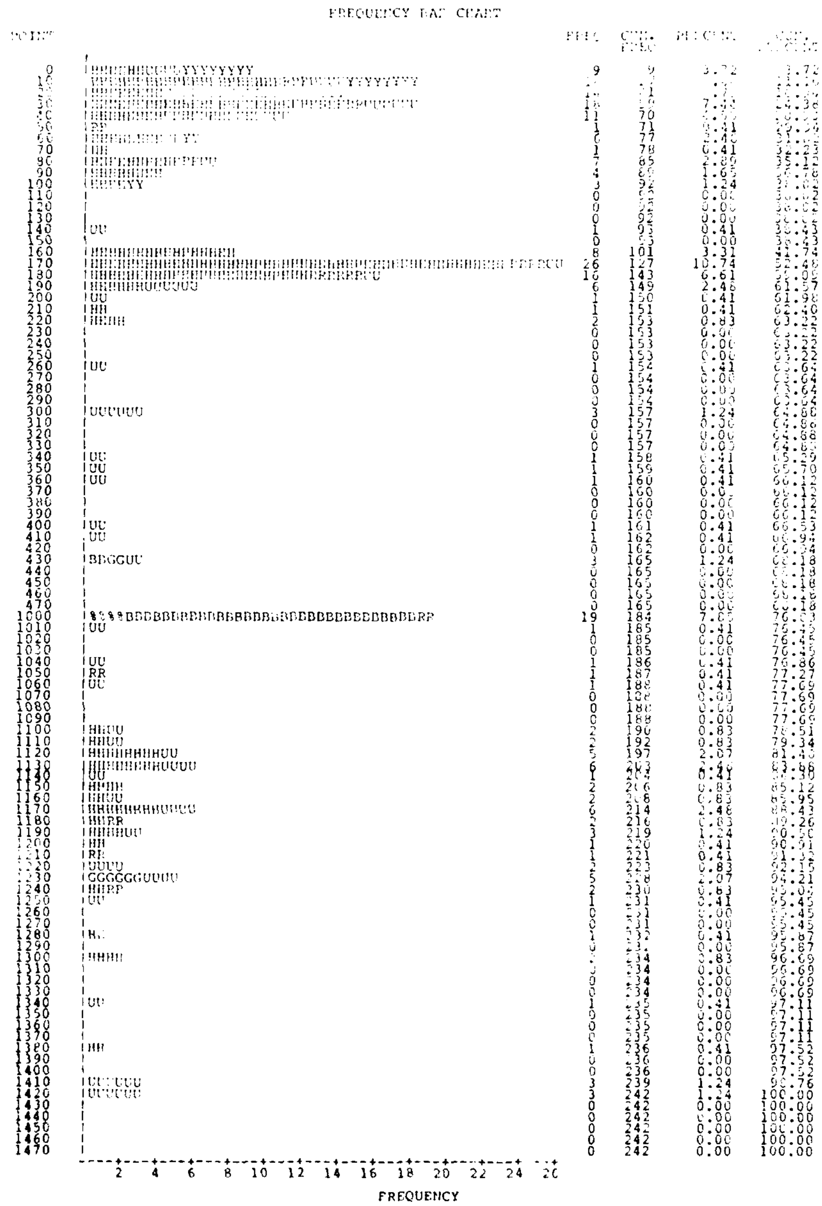

Figure 58. Herp-patrol point analysis of calling frogs on the Gatlin Canal site during SY2. Point = midpoint of 10-m section of herp-patrol transect.

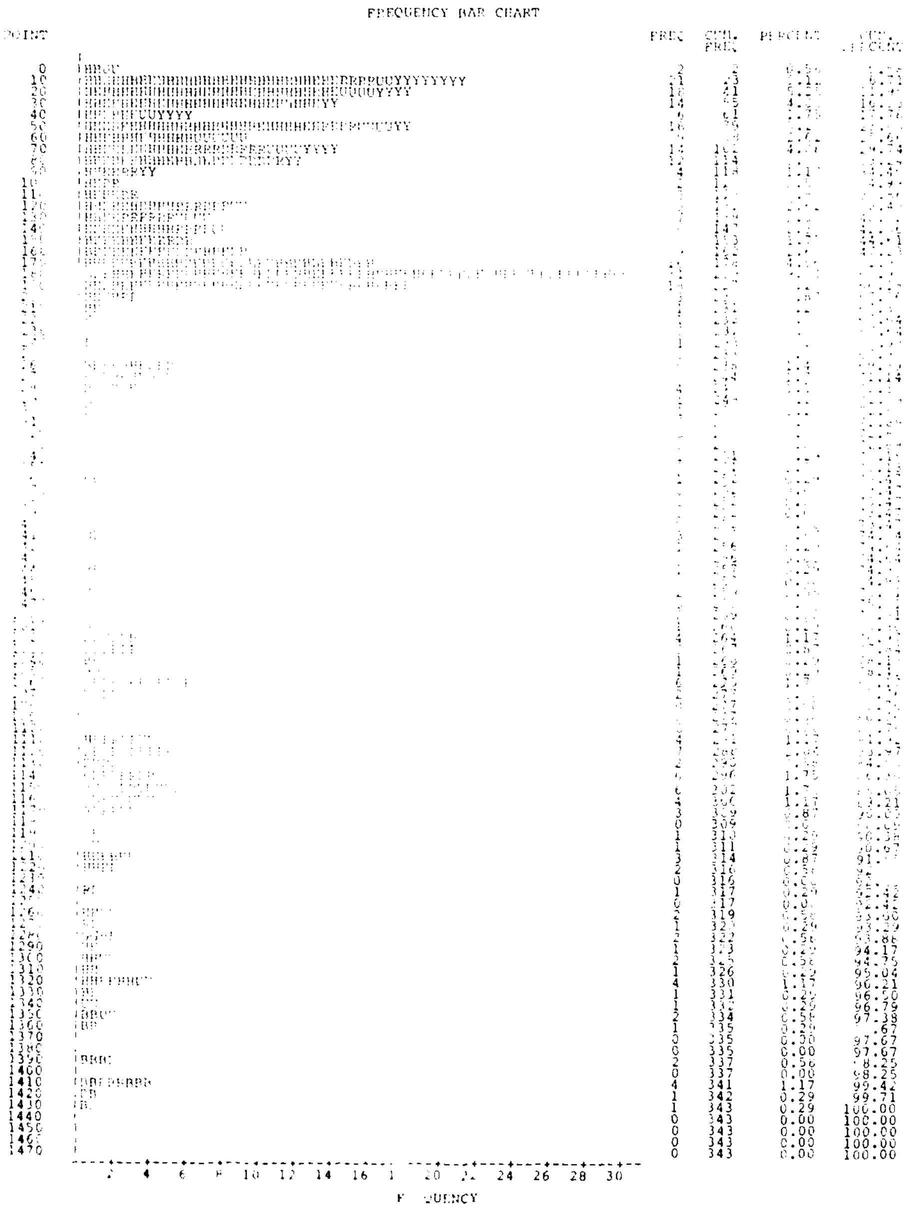

Figure 59. Herp-patrol point analysis of calling frogs on the Gatlin Canal site during SY3. Point = midpoint of 10-m section of herp-patrol transect.

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                                              FREQUENCY BAR CHART
TRIP       TRAPS                                                                                  FREQ  CUM.   PERCENT    CUM.
                                                                                                        FREQ             PERCENT
                 |
10 NOV 77   21   |                                                                                  0     0     0.00      0.00
18 DEC 77   21   |                                                                                  0     0     0.00      0.00
29 DEC 77   21   |                                                                                  0     0     0.00      0.00
11 JAN 78   20   |                                                                                  0     0     0.00      0.00
29 JAN 78   21   |                                                                                  0     0     0.00      0.00
14 FEB 78   21   |                                                                                  0     0     0.00      0.00
 1 MAR 78   21   |AAAAAAAAAA                                                                        1     1     1.25      1.25
22 MAR 78   20   |AAAAAAAAAA                                                                        1     2     1.25      2.50
28 MAR 78   20   |                                                                                  0     2     0.00      2.50
12 APR 78   20   |LLLLLLLLLL                                                                        1     3     1.25      3.75
24 APR 78   20   |                                                                                  0     3     0.00      3.75
 9 MAY 78   20   |AAAAAAAAAA                                                                        1     4     1.25      5.00
24 MAY 78   20   |SSSSSSSSSSSSSSSSSSSS                                                              2     6     2.50      7.50
19 JUN 78   20   |                                                                                  0     6     0.00      7.50
27 JUN 78   20   |IIIIIIIIIINNNNNNNNNNNNNNNNNNNNSSSSSSSSSS                                          4    10     5.00     12.50
 9 JUL 78   20   |KKKKKKKKKKNNNNNNNNNNSSSSSSSSSS                                                    3    13     3.75     16.25
27 JUL 78   20   |AAAAAAAAAANNNNNNNNNNSSSSSSSSSSSSSSSSSSSS                                          4    17     5.00     21.25
15 AUG 78   20   |AAAAAAAAAAAAAAAAAAAASSSSSSSSSS                                                    3    20     3.75     25.00
31 AUG 78   20   |LLLLLLLLLLWWWWWWWWWW                                                              2    22     2.50     27.50
13 SEP 78   20   |LLLLLLLLLLSSSSSSSSSSSSSSSSSSSS                                                    3    25     3.75     31.25
29 SEP 78   20   |AAAAAAAAAASSSSSSSSSS                                                              2    27     2.50     33.75
13 OCT 78   20   |AAAAAAAAAA                                                                        1    28     1.25     35.00
02 NOV 78   20   |RRRRRRRRRRUUUUUUUUUU                                                              2    30     2.50     37.50
17 NOV 78   20   |NNNNNNNNNNNNNNNNNNNNOOOOOOOOOOSSSSSSSSSSSSSSSSSSSS                                5    35     6.25     43.75
30 NOV 78   20   |AAAAAAAAAA                                                                        1    36     1.25     45.00
15 DEC 78   20   |                                                                                  0    36     0.00     45.00
12 JAN 79   20   |SSSSSSSSSS                                                                        1    37     1.25     46.25
19 JAN 79   20   |AAAAAAAAAARRRRRRRRRR                                                              2    39     2.50     48.75
02 FEB 79   20   |                                                                                  0    39     0.00     48.75
17 FEB 79   20   |                                                                                  0    39     0.00     48.75
02 MAR 79   20   |AAAAAAAAAA                                                                        1    40     1.25     50.00
14 MAR 79   20   |                                                                                  0    40     0.00     50.00
06 APR 79   20   |OOOOOOOOOO                                                                        1    41     1.25     51.25
20 APR 79   20   |                                                                                  0    41     0.00     51.25
11 MAY 79   20   |LLLLLLLLLL                                                                        1    42     1.25     52.50
25 MAY 79   20   |OOOOOOOOOO                                                                        1    43     1.25     53.75
14 JUN 79   20   |++++++++++OOOOOOOOOO                                                              2    45     2.50     56.25
27 JUN 79   19   |IIIIIIIIIIOOOOOOOOOOSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS                                5    50     6.25     62.50
10 JUL 79   20   |&&&&&&&&&&KKKKKKKKKK                                                              2    52     2.50     65.00
25 JUL 79   19   |LLLLLLLLLL                                                                        1    53     1.25     66.25
23 AUG 79   19   |++++++++++++++++++++AAAAAAAAAARRRRRRRRRR                                          4    57     5.00     71.25
30 AUG 79   20   |&&&&&&&&&&AAAAAAAAAALLLLLLLLLLSSSSSSSSSS                                          4    61     5.00     76.25
26 SEP 79   20   |SSSSSSSSSSUUUUUUUUUU                                                              2    63     2.50     78.75
27 OCT 79   40   |NNNNNNNNNN                                                                        1    64     1.25     80.00
20 NOV 79   40   |AAAAAAAAAA                                                                        1    65     1.25     81.25
19 DEC 79   40   |&&&&&&&&&&                                                                        1    66     1.25     82.50
09 FEB 80   40   |                                                                                  0    66     0.00     82.50
08 MAR 80   40   |                                                                                  0    66     0.00     82.50
12 APR 80   40   |AAAAAAAAAARRRRRRRRRRSSSSSSSSSS                                                    3    69     3.75     86.25
10 MAY 80   40   |LLLLLLLLLLRRRRRRRRRR                                                              2    71     2.50     88.75
14 JUN 80   40   |                                                                                  0    71     0.00     88.75
09 JUL 80   40   |                                                                                  0    71     0.00     88.75
15 AUG 80   40   |RRRRRRRRRR                                                                        1    72     1.25     90.00
05 SEP 80   40   |++++++++++++++++++++++++++++++++++++++++IIIIIIIIIISSSSSSSSSSSSSSSSSSSSWWWWWWWWWW  8    80    10.00    100.00
                 ----------+---------+---------+---------+---------+---------+---------+---------+
                           1         2         3         4         5         6         7         8
                                                     FREQUENCY
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Figure 60. Funnel trap trip analysis of amphibians and reptiles on the Gatlin Canal site. Trip = date of trapping; traps = total number of traps set on a date.

FREQUENCY BAR CHART

TRIP	MINUTES		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
14 JUL 77		FFFFFFFFSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	22	22	4.07	4.07
04 AUG 77		CCCCCCCCFFFFFFFFNNSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	39	61	7.21	11.28
17 AUG 77		CCCCFFKKSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSWW	30	91	5.55	16.82
22 SEP 77		CCCCCCCCFFFFFFFFFFFFFFFFFFFFSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	39	130	7.21	24.03
20 OCT 77	113	CCFFKKSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSTT	40	170	7.39	31.42
03 NOV 77	70	CCCCCCFFFFFFSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	29	199	5.36	36.78
16 NOV 77	87	CCFFFFNNNNNNNNSSSSSSSSSSSSSSSSSSSS	17	216	3.14	39.93
14 DEC 77	90	FFFFLLSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSSS	23	239	4.25	44.18
22 DEC 77	61	SSSSSSSSSS	5	244	0.92	45.10
12 JAN 78	70	SSSSSSSSSSSSSSSSSSSS	10	254	1.85	46.95
30 J[illegible]	46	SSSSSSSSSSSS	6	260	1.11	48.06
14 FEB 78	65	DDFFSSSSSS	5	265	0.92	48.98
28 FEB 78	83	CCCCFFOOSSSSSSSSSSSSSSSSSSSSSSSSWW	17	282	3.14	52.13
21 MAR 78	64	CCFFFFFFSSSSWWWW	8	290	1.48	53.60
27 MAR 78	62	CCFFNNSSSSWW	6	296	1.11	54.71
10 APR 78	67	SSSS	2	298	0.37	55.08
24 APR 78	47	OO	1	299	0.18	55.27
8 MAY 78	68	CCFFNNSSWW	5	304	0.92	56.19
23 MAY 78	58	CCSS	2	306	0.37	56.56
19 JUN 78	63	LLSSSSSSSSSSSSSSSSSSSSSS	12	318	2.22	58.78
27 JUN 78	56	CCCC	2	320	0.37	59.15
10 JUL 78	60	LLSSSSSSSSSSSSSSSSWW	10	330	1.85	61.00
27 JUL 78	76	CCFFFFFFKKSSSS	7	337	1.29	62.29
15 AUG 78	82	CCFFFFFFFFSSSSSSSSSSSSSSSSSSSSSSSSSSSSWWWW	21	358	3.88	66.17
31 AUG 78	55	NNSSSSSSSSSSSSSSSSTTWW	11	369	2.03	68.21
13 SEP 78	78	CCFFNNNNSSSSSSSSSSSSSSSSSSSSWW	15	384	2.77	70.98
29 SEP 78	60	CCFFNNNNSSSSSSSSSSSS	10	394	1.85	72.83
14 OCT 78	89	CCKKNNSSSS	5	399	0.92	73.75
11 NOV 78	43	NN	1	400	0.18	73.94
17 NOV 78	53	CCFFFFFFFFFFSSSSSSSSSS	11	411	2.03	75.97
01 DEC 78	57	CCCCFFFFFFSSSSSS	8	419	1.48	77.45
15 DEC 78	54	AACCSSSS	4	423	0.74	78.19
12 JAN 79	39	CC	1	424	0.18	78.37
19 JAN 79	38	FFSSSSSS	4	428	0.74	79.11
02 FEB 79	30	DD	1	429	0.18	79.30
18 FEB 79	50	DDSSWW	3	432	0.55	79.85
03 MAR 79	22	FFSS	2	434	0.37	80.22
14 MAR 79	47	CCWWWW	3	437	0.55	80.78
07 APR 79	48	CCCCCCCCFFFFFFFF	8	445	1.48	82.26
21 APR 79	52	CCFFFFSS		449	0.74	82.99
12 MAY 79	97	CCCCFFFFFFSSSS		456	1.29	84.29
26 MAY 79	45	CCCCFFSSSS		461	0.92	85.21
13 JUN 79	71	CCCCCCCCFFSSSSSSSSSSSSSSSSSS		475	2.59	87.80
26 JUN 79	51	CCFFSSSSSSSS		481	1.11	88.91
11 JUL 79	41	FFSS	2	483	0.37	89.28
25 JUL 79	51	CC	1	484	0.18	89.46
23 AUG 79	37	CCCCEE	3	487	0.55	90.02
28 AUG 79	56	EESS	2	489	0.37	90.39
13 SEP 79	40	CCCCFFFFFFFFSS	7	496	1.29	91.68
24 SEP 79	53	FFSS	2	498	0.37	92.05
13 OCT 79	39	CCFF	2	500	0.37	92.42
26 OCT 79	61	FFFFFF	3	503	0.55	92.98
07 NOV 79	39	CCFFFFFFSS	5	508	0.92	93.90
20 NOV 79	50	FFLLSSSS	4	512	0.74	94.64
05 DEC 79	37	FFFFSS	3	515	0.55	95.19
18 DEC 79	39	CCCCCC	3	518	0.55	95.75
12 JAN 80	45	FF	1	519	0.18	95.93
01 FEB 80	35		0	519	0.00	95.93
09 FEB 80	31		0	519	0.00	95.93
23 FEB 80	26		0	519	0.00	95.93
07 MAR 80	42	SS	1	520	0.18	96.12
21 MAR 80	33	FF	1	521	0.18	96.30
11 APR 80	40	CC	1	522	0.18	96.49
25 APR 80	41	WW	1	523	0.18	96.67
10 MAY 80	33	CC	1	524	0.18	96.86
30 MAY 80	37		0	524	0.00	96.86
13 JUN 80	36	SS	1	525	0.18	97.04
27 JUN 80	46	CCFFFFFFFFSSTT	7	532	1.29	98.34
24 JUN 80	39	SS	1	533	0.18	98.52
01 AUG 80	61	SSSSSS	3	536	0.55	99.08
14 AUG 80	41	FF	1	537	0.18	99.26
29 AUG 80	40		0	537	0.00	99.26
05 SEP 80			0	537	0.00	99.26
17 SEP 80	60	CCLLSSSS	4	541	0.74	100.00

2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40

FREQUENCY

Figure 61. Herp-patrol trip analysis of salamanders and reptiles on the Gatlin Canal site. Trip = date of herp-patrol; minutes = total sampling time of a herp-patrol on a date (time not recorded prior to 13 October 1977).

FREQUENCY BAR CHART

TRIP	MINUTES		FREQ	CUM. FREQ	PERCENT	CUM. PERCENT
	1		0	0	0.00	0.00
	2		0	0	0.00	0.00
	3		0	0	0.00	0.00
	4		0	0	0.00	0.00
21 OCT 77	113	R	1	1	0.15	0.15
3 NOV 77	70		0	1	0.00	0.15
17 NOV 77	87		0	1	0.00	0.15
14 DEC 77	90	UUUUUUUU	8	9	1.17	1.32
22 DEC 77	61		0	9	0.00	1.32
12 JAN 78	70		0	9	0.00	1.32
30 JAN 78	46		0	9	0.00	1.32
14 FEB 78	65		0	9	0.00	1.32
28 FEB 78	83	UUUUUUUU	8	17	1.17	2.49
21 MAR 78	64		0	17	0.00	2.49
27 MAR 78	62	UUUU	4	21	0.59	3.08
11 APR 78	67	UUU	3	24	0.44	3.52
24 APR 78	47	BBBBB	5	29	0.73	4.25
8 MAY 78	68	BGHU	4	33	0.59	4.84
24 MAY 78	58		0	33	0.00	4.84
20 JUN 78	63	HHHHHRUU	8	41	1.17	6.01
28 JUN 78	56		0	41	0.00	6.01
11 JUL 78	60	HHHHHUUYYYY	11	52	1.61	7.62
28 JUL 78	76	Y	1	53	0.15	7.77
14 AUG 78	82	BBBBBGGGHHHHHHHHHHHHHHHUYYY	27	80	3.96	11.73
31 AUG 78	55	BBHHHHHHYYYYY	13	93	1.91	13.64
14 SEP 78	78	HHY	3	96	0.44	14.08
29 SEP 78	60	H	1	97	0.15	14.22
14 OCT 78	89	HUU	3	100	0.44	14.66
11 NOV 78	43	UUUU	4	104	0.59	15.25
17 NOV 78	53	UU	2	106	0.29	15.54
1 DEC 78	57	U	1	107	0.15	15.69
15 DEC 78	54		0	107	0.00	15.69
12 JAN 79	39	UUUUU	5	112	0.73	16.42
19 JAN 79	38		0	112	0.00	16.42
2 FEB 79	30		0	112	0.00	16.42
18 FEB 79	50	UUUUUUUU	8	120	1.17	17.60
3 MAR 79	22	UUU	3	123	0.44	18.04
14 MAR 79	47	UUUUUU	6	129	0.88	18.91
7 APR 79	48	%%	2	131	0.29	19.21
21 APR 79	52	UUUUUUUU	8	139	1.17	20.38
12 MAY 79	97	HHHHRRRRUUUUU	13	152	1.91	22.29
26 MAY 79	45	RRRRUUUY	8	160	1.17	23.46
13 JUN 79	71	HHHHR	5	165	0.73	24.19
26 JUN 79	51	GGGHHHHHHHHHHHHHHHRUY	21	186	3.08	27.27
11 JUL 79	41	GHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHRRRUYY	41	227	6.01	33.28
25 JUL 79	51	BBBBBBBBBBBBBBBBBHHHHHHHHHHHHHHHHHHHHHHHHHR	43	270	6.30	39.59
23 AUG 79	37	HHHHHHHHH	9	279	1.32	40.91
28 AUG 79	56	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHUUYYYY	41	320	6.01	46.92
13 SEP 79	40	HHHHRRRUUYY	11	331	1.61	48.53
24 SEP 79	53	HHHHHHYY	8	339	1.17	49.71
13 OCT 79	39	RR	2	341	0.29	50.00
26 OCT 79	61	R	1	342	0.15	50.15
7 NOV 79	39	UUUUUUUU	8	350	1.17	51.32
20 NOV 79	50	RUUUUUU	7	357	1.03	52.35
5 DEC 79	37		0	357	0.00	52.35
18 DEC 79	39		0	357	0.00	52.35
12 JAN 80	45	UUUUUUU	7	364	1.03	53.37
1 FEB 80	35		0	364	0.00	53.37
9 FEB 80	31		0	364	0.00	53.37
23 FEB 80	26	UUU	3	367	0.44	53.81
7 MAR 80	42	RUUUU	5	372	0.73	54.55
21 MAR 80	33	RUUU	4	376	0.59	55.13
11 APR 80	40	HHHRRRRRYYY	11	387	1.61	56.74
25 APR 80	41	HHHHHH[illegible]RRRU	14	401	2.05	58.80
10 MAY 80	33	BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBRRRRRUYY	40	441	5.87	64.66
30 MAY 80	37	BGHHHHHHHHHHHHHHHHHHHHHHHHHHHHRRRRUUUU	38	479	5.57	70.23
13 JUN 80	36	HHHHHHHHHHHRRR	14	493	2.05	72.29
27 JUN 80	46	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHRRRRRRRUYYYYYY	53	546	7.77	80.06
24 JUL 80	39	HHHHHHHHHHHHHHHHHRRRRRR	23	569	3.37	83.43
1 AUG 80	61	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHRRRR	33	602	4.84	88.27
14 AUG 80	41	HHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHHR	40	642	5.87	94.13
29 AUG 80	40	HHHHHHHHHHHHHHHHHHHHHHHHHHHHRY	30	672	4.40	98.53
5 SEP 80	6	YY	2	674	0.29	98.83
17 SEP 80	60	HHHHHHHH	8	682	1.17	100.00

5 10 15 20 25 30 35 40 45 50

FREQUENCY

Figure 62. Herp-patrol trip analysis of calling frogs on the Gatlin Canal site. Trip = date of herp-patrol; minutes = total sampling time of a herp-patrol on a date (time not recorded prior to 13 October 1977).

APPENDIX A: SUMMARY OF PLANT SPECIES AND SUBSTRATUM TYPE FOR ALL PERMANENT SHORELINE HERPETOFUANAL TRAPPING STATIONS ON LAKE CONWAY DURING THE FIRST POSTSTOCKING STUDY PERIOD. Given are the three most abundant plant species or habitat conditions coded in order of decreasing percent cover within a 2-sq-m area of each trapping station averaged over the January and August 1979 vegetation samples. If a significant proportion of the quadrat contained no vegetation but was in natural surroundings, it was coded as "Bare bottom"; likewise, "Beach" means man-made white sand beach, and "No other vegetation present" means that other plant species were monodominant or codominant in the quadrat. If plant cover changed as a result of man-made habitat modification during the first poststocking study period, the date of change and new conditions are given in parentheses. Substratum types are coded as follows: 1 = sand; 2 = 1-5 cm mud; 3 = 6-10 cm mud; 4 = 11-15 cm mud; 5 = 16-20 cm mud; 6 = > 20 cm mud.

Table A1

South Pool

Habitat Condition	Trap Station											
	0	10	20	30	40	50	60	70	80	90	100	110
Eichhornia crassipes	1	1	1	2								
Fuirena scirpoides					2	2	2	2	2	2	3	
Nuphar luteum												
Panicum hemitomon						3	3					
Panicum repens												
Pontederia lanceolata					3			3	3	3		3
Typha latifolia				3							2	1
No other vegetation present	2	2										
Bare bottom				1	1	1	1	1	1	1	1	2
Beach	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)		
Substratum	3(1)	3(1)	3(1)	1	1	1	1	1	1	1	2	2
Date of habitat change	4/79	→	→	→	4/79	5/79	→	→	→	5/79		

(Continued)

(Sheet 1 of 4)

Table A1 (Continued)

Habitat Condition	Trap Station											
	120	130	140	150	160	170	180	190	200	210	220	230
Eichhornia crassipes												
Fuirena scirpoides		1	1		1	1	3			1	1	1
Nuphar luteum												
Panicum hemitomon			2	2	2							
Panicum repens												
Pontederia lanceolata	2			1		2	1	2	1	2	2	2
Typha latifolia	1	2										
No other vegetation present								3	[illegible]			
Bare bottom	3	3	3	3	3	3	2	1	2	3	3	3
Beach												
Substratum	1	1	1	1	1	1	1	1	1	1	1	1
Date of habitat change												

(Continued)

(Sheet 2 of 4)

Table A1 (Continued)

Habitat Condition	Trap Station											
	240	250	260	270	280	290	300	310	320	330	340	350
Eichhornia crassipes												
Fuirena scirpoides									2	1	1	
Nuphar luteum												
Panicum hemitomon								2	1			
Panicum repens												
Pontederia lanceolata									3			
Typha latifolia												
No other vegetation present												
Bare bottom										2	2	
Beach	1	1	1	1	1		1	1				1
Substratum	1	1	1	1	1		1	1	1	1	1	1
Date of habitat change												

(Continued)

Table A1 (Concluded)

Habitat Condition	Trap Station 360	370	380	390	400	410	420	430	440	450	460
Eichhornia crassipes										1	1
Fuirena scirpoides	2	2		1							
Nuphar luteum											
Panicum hemitomon					2	2	2	2			
Panicum repens											
Pontederia lanceolata	1	1	2	3	1	1	1	1	1		
Typha latifolia											
No other vegetation present			3		3	3	3	3	2	2	2
Bare bottom	3	3									
Beach			1	2							
Substratum	1	2	2	2	2	2	2	2	2	3	3
Date of habitat change											

(Sheet 4 of 4)

Table A2

Middle Pool

Habitat Condition	Trap Station									
	1000	1010	1020	1030	1040	1050	1060	1070	1080	1090
Eichhornia crassipes										
Fuirena scirpoides	2	2	2	2	2	2	2	2	2	2
Nuphar luteum										
Panicum hemitomon										
Panicum repens										
Pontederia lanceolata										
Typha latifolia									3	3
No other vegetation present										
Bare bottom										
Beach	1	1	1	1	1	1	1	1	1	1
Substratum	1	1	1	1	1	1	1	1	1	1
Date of habitat change										

(Continued)

(Sheet 1 of 2)

Table A2 (Concluded)

Habitat Condition	Trap Station 1100	1110	1120	1130	1140	1150	1160	1170	1180	1190
Eichhornia crassipes				1	1	1	1	1	1	1
Fuirena scirpoides	2	2	1							
Nuphar luteum										
Panicum hemitomon										
Panicum repens										
Pontederia lanceolata				2	2	2	2	2		
Typha latifolia				3	3	3	3	3		
No other vegetation present									2	2
Bare bottom										
Beach	1	1	1							
Substratum	1	1	1	3	3	3	3	3	4	4
Date of habitat change										

(Sheet 2 of 2)

Table A3

East Pool

Habitat Condition	Trap Station 1010	1020	1030	1040	1050	1060	1070	1080	1090	1100
Eichhornia crassipes	1	1			2	3	2	1	1	1
Fuirena scirpoides										
Nuphar luteum										
Panicum hemitomon										
Panicum repens										
Pontederia lanceolata			1	1						
Typha latifolia	2	2		2	1	1	1	2	2	2
Ludwigia peruviana						2	3	3	3	3
No other vegetation present			2	3	3					
Bare bottom										
Beach										
Substratum	3	3	2	2	2	2	3	4	5	5
Date of habitat change										

(Continued)

Table A3 (Concluded)

Habitat Condition	Trap Station 1110	1120	1130	1140	1150	1160	1170	1180	1190	1200
Eichhornia crassipes	1	1	1	1	1	1	1	1	1	1
Fuirena scirpoides										
Nuphar luteum										
Panicum hemitomon										
Panicum repens										
Pontederia lanceolata										
Typha latifolia	2	2		2						
Ludwigia peruviana	3						2	2	2	2
No other vegetation present		3	3	3	2	2	3	3	3	3
Bare bottom										
Beach										
Substratum	5	2	2	3	2	3	3	4	5	5
Date of habitat change										

(Sheet 2 of 2)

Table A4

West Pool

Habitat Condition	Trap Station 0	10	20	30	40*	60	70	80	90	[illegible]	[illegible]	[illegible]	[illegible]
Eichhornia crassipes									1	1	1	1	1
Fuirena scirpoides	2	2	1	1	1	1	1						
Nuphar luteum													
Panicum hemitomon			2	2	2			1					
Panicum repens			3	3	3	2	2						
Pontederia lanceolata								2	2		2		
Typha latifolia													2
No other vegetation present						3	3	3	3	3	3	2	3
Bare bottom	1	1											
Beach													
Substratum	1	1	1	1	1	1	1	2	2	3	3	3	2
Date of habitat change													

(Continued)

*Station 50 was located under a boat dock and this trap was not set.

(Sheet 1 of 3)

Table A4 (Continued)

Habitat Condition	Trap Station											
	140	150	160	170	180	190	200	210	220	230	240	250
[illegible] crassipes	1	1	2	2	3	1	2		1	1	1	2
[illegible] [illegible]oides												
Nuphar luteum												
Panicum hemitomon			3				3	2				
Panicum repens		2										
Pontederia lanceolata	2				2	2	1	1	2		2	1
Typha latifolia		1	1	1								
No other vegetation present	3	3		3		3		3		2	3	
Bare bottom												
Beach												
Substratum	2	3	2	2	2	3	2	2	4	4	4	2
Date of habitat change												

(Continued)

(Sheet 2 of 3)

Table A4 (Concluded)

Habitat Condition	Trap Station 260	270	280	290	300	310	320	330	340	350	360	370
Eichhornia crassipes	1	3	2	3	1	1	1		2	1	1	1
Fuirena scirpoides												
Nuphar luteum												
Panicum hemitomon								2	3		2	3
Panicum repens												
Pontederia lanceolata	2	2	1	1				1	1	2		
Typha latifolia	3	1	3	2	2	2	2				3	2
No other vegetation present					3	3	3	3		3		
Bare bottom												
Beach												
Substratum	2	2	2	3	4	5	4	2	3	3	3	2
Date of habitat change												

(Sheet 3 of 3)

Table A5

Gatlin Canal

Habitat Condition	Trap Station 0	10	20	30	40	50	60	70	80	90	100	110
Eichhornia crassipes		1	1	1	1					2	3	1
Fuirena scirpoides												
Nuphar luteum		2	2	2	2	1	2	3				
Panicum hemitomon												
Panicum repens		3	3	3	3	2	1	1	1	1	2	2
Pontederia lanceolata										3	1	
Typha latifolia								2	2			
No other vegetation present						3	3					3
Bare bottom	1											
Beach												
Substratum	2	3	4	4	3	2	2	2	3	4	2	2
Date of habitat change												

(Continued)

Table A5 (Concluded)

Habitat Condition	Trap Station 120	130	140	150	160	170	180	190
Eichhornia crassipes					3	1	1	2
Fuirena scirpoides								
Nuphar luteum	3							
Panicum hemitomon								
Panicum repens	2	2	2	2	1			1
Pontederia lanceolata	1	1	1	1				
Typha latifolia					2	2	2	3
No other vegetation present		3	3	3				
Bare bottom								
Beach								
Substratum	3	3	3	3	2	3	3	3
Date of habitat change								

(Sheet 2 of 2)

APPENDIX B: SUMMARY OF PLANT SPECIES AND SUBSTRATUM TYPE FOR ALL PERMANENT SHORELINE HERPETOFAUNAL TRAPPING STATIONS ON LAKE CONWAY DURING THE SECOND POSTSTOCKING STUDY PERIOD. Given are the three most abundant plant species or habitat conditions coded in order of decreasing percent cover within a 2-sq-m area of each trapping station averaged over the January and August 1980 vegetation samples. If a significant proportion of the quadrat contained no vegetation but was in natural surroundings, it was coded as "Bare bottom"; likewise, "Beach" means man-made white sand beach; and "No other vegetation present" means that other plant species were monodominant or codominant in the quadrat. If plant cover changed as a result of man-made habitat modification during the second poststocking study period, the date of change and new conditions are given in parentheses. Substratum types are coded as follows: 1 = sand; 2 = 1-5 cm mud; 3 = 6-10 cm mud; 4 = 11-15 cm mud; 5 = 16-20 cm mud; 6 = > 20 cm mud.

Table B1

South Pool

Habitat Condition	Trap Station 0	10	20	30	40	50	60	70	80	90	100	110
Eichhornia crassipes											3	2
Fuirena scirpoides												
Ludwigia peruviana											2	3
Nuphar luteum												
Panicum hemitomon												
Panicum repens												
Pontederia lanceolata							2					
Typha latifolia											1	1
No other vegetation present	2	2	2	2	2	2	3	2	2	2		
Bare bottom												
Beach	1	1	1	1	1	1	1	1	1	1		
Substratum	1	1	1	1	1	1	1	1	1	1	2	2
Date of habitat change												

(Continued)

(Sheet 1 of 5)

Table B1 (Continued)

Habitat Condition	Trap Station 120	130	140	150	160	170	180	190	200	210	220
Eichhornia crassipes	1	1	1						2		
Fuirena scirpoides					1	1	3			1	1
Ludwigia peruviana	1								3	3	
Nuphar luteum											
Panicum hemitomon			2	2	2						
Panicum repens											
Pontederia lanceolata				1		2	1	2	1	2	2
Typha latifolia	3	3									
No other vegetation present			2	3	3	3		3			3
Bare bottom		2					2	1			
Beach			(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Substratum	2	1	1	1	1	1	1	1	2	2	2
Date of habitat change			5/80	→	→	→	→	5/80	9/80	→	9/80

(Continued)

(Sheet 2 of 5)

Table B1 (Continued)

Habitat Condition	Trap Station 230	240	250	260	270	280	290	300	310	320	330
Eichhornia crassipes											
Fuirena scirpoides	1							2	3	1	1
Ludwigia peruviana	3									2	2
Nuphar luteum											
Panicum hemitomon									2		
Panicum repens											
Pontederia lanceolata	2										3
Typha latifolia											
No other vegetation present		2	2	2	2	2	2	3		3	
Bare bottom										1	1
Beach	(1)	1	1	1	1	1	1	1	1		
Substratum	2	2	2	2	2	2	2	1	1	1	1
Date of habitat change	9/80										

(Continued)

Table B1 (Continued)

Habitat Condition	Trap Station 340	350	360	370	380	390	400	410	420	430	440
Eichhornia crassipes								1	1	1	1
Fuirena scirpoides	1		2	3		1	1				
Ludwigia peruviana	2						3				
Nuphar luteum											
Panicum hemitomon					2		2				
Panicum repens											
Pontederia lanceolata	3		3	2		2		2	2	2	3
Typha latifolia											2
No other vegetation present		2			3			3	3	3	
Bare bottom	1		1	1							
Beach		1			1	3					
Substratum	1	1	1	2	2	1	2	2	2	2	2
Date of habitat change											

(Continued)

Table B1 (Concluded)

Habitat Condition	Trap Station 450	Trap Station 460
Eichhornia crassipes	1	1
Fuirena scirpoides		
Ludwigia peruviana		
Nuphar luteum		
Panicum hemitomon		
Panicum repens		
Pontederia lanceolata	2	
Typha latifolia		
No other vegetation present	3	2
Bare bottom	(1)	(1)
Beach		
Substratum	3(2)	3(2)
Date of habitat change	5/80	5/80

(Sheet 5 of 5)

Table B2

Middle Pool

Habitat Condition	Trap Station 1000	1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110
Eichhornia crassipes												
Fuirena scirpoides	2	2	2	2	2	2	2	1	1	1	1	1
Nuphar luteum												
Panicum hemitomon												
Pancium repens												
Pontederia lanceolata												
Typha latifolia								3	2	2	3	3
No other vegetation present												
Bare bottom												
Beach	1	1	1	1	1	1	1	2	3	3	2	2
Substratum	1	1	1	1	1	1	1	1	1	1	1	1
Date of habitat change												

(Continued)

Table B2 (Concluded)

Habitat Condition	Trap Station 1120	1130	1140	1150	1160	1170	1180	1190
Eichhornia crassipes		1	1	1	1	1	1	1
Fuirena scirpoides	1							
Nuphar luteum								
Panicum hemitomon								
Panicum repens								
Pontederia lanceolata		2	2	2	2	2		
Typha latifolia	3				3	3		
No other vegetation present		3	3	3			2	2
Bare bottom								
Beach	2							
Substratum	1	3	3	3	3	3	3	3
Date of habitat change								

(Sheet 2 of 2)

Table B3

East Pool

Habitat Condition	Trap Station 1010	1020	1030	1040	1050	1060	1070	1080	1090	1100	1110	1120	1130
Eichhornia crassipes	1	1	1	2	3	1	1	1	1	1	1	1	1
Fuirena scirpoides													
Ludwigia peruviana						3	3	2	2	2	2	2	
Nuphar luteum													
Panicum hemitomon													
Panicum repens													
Pontederia lanceolata			2	3		2	2						
Sagitaria lancifolia													
Typha latifolia	2	2	3	1	1								2
No other vegetation present	3	3						3	3	3	3	3	3
Bare bottom					2								
Beach													
Substratum	3	3	2	2	2	2	2	2	2	2	2	2	2
Date of habitat change													

(Continued)

(Sheet 1 of 4)

Table B3 (Continued)

Habitat Condition	Trap Station 1140	1150	1160	1170	1180	1190	1200	1210	1220	1230	1240	1250	1260
Eichhornia crassipes	1	1	1	1	1	1	1	1	1	1	1	1	1
Fuirena scirpoides													
Ludwigia peruviana				2				2	2	2	2	2	2
Nuphar luteum													
Panicum hemitomon													
Panicum repens													
Pontederia lanceolata													
Sagitaria lancifolia													
Typha latifolia													
No other vegetation present	2	2	2	3	2	2	2	3	3	3	3	3	3
Bare bottom													
Beach													
Substratum	2	2	2	3	2	2	2	2	2	2	3	3	3
Date of habitat change													

(Continued)

(Sheet 2 of 4)

Table B3 (Continued)

Habitat Condition	Trap Station 1270	1280	1290	1300	1310	1320	1330	1340	1350	1360	1370	1380	1390
Eichhornia crassipes	1	1	1	1	1	1	1	1	1	1	1	1	
Fuirena scirpoides													
Ludwigia peruviana	2	2		2	2	2	3	3	2		2	2	3
Nuphar luteum													
Panicum hemitomon													
Panicum repens													
Pontederia lanceolata							2						
Sagitaria lancifolia								2		2			2
Typha latifolia													
No other vegetation present	3	3	2	3	3	3			3	3	3	3	
Bare bottom													
Beach													
Substratum	3	4	4	3	3	4	3	3	5	4	3	4	3
Date of habitat change													

(Continued)

(Sheet 3 of 4)

Table B3 (Concluded)

Habitat Condition	Trap Station							
	1400	1410	1420	1430	1440	1450	1460	1470
Eichhornia crassipes						2	1	1
Fuirena scirpoides								
Ludwigia peruviana	3				2		2	2
Nuphar luteum								
Panicum hemitomon								
Panicum repens								
Pontederia lanceolata	2				3			
Sagitaria lancifolia		2	2	2		3		
Typha latifolia			3	3				
No other vegetation present		3					3	
Bare bottom	1	1	1	1	1	1		3
Beach								
Substratum	3	3	3	3	3	3	2	3
Date of habitat change								

(Sheet 4 of 4)

Table B4

West Pool

Habitat Condition	Trap Station 0	10	20	30	40*	60	70	80	90	100	110	120
Eichhornia crassipes								1	1	1	1	1
Fuirena scirpoides	2	2	2	2	2	2	2					
Ludwigia peruviana									2	2		
Nuphar luteum												
Panicum hemitomon			1									
Panicum repens				3	3	1	1					
Pontederia lanceolata								2				
Typha latifolia											2	2
No other vegetation present	3	3	3			3	3	3	3	3	3	3
Bare bottom												
Beach	1	1		1	1							
Substratum	1	1	1	1	1	1	1	2	2	2	3	3
Date of habitat change												

(Continued)

*Station 50 was located under a boat dock and this trap was not set.

(Sheet 1 of 4)

Table B4 (Continued)

Habitat Condition	Trap Station 130	140	150	160	170	180	190	200	210	220	230
Eichhornia crassipes	1	1	1	1	2	2			3		
Fuirena scirpoides											
Ludwigia peruviana				2			3	2		2	2
Nuphar luteum											
Panicum hemitomon											
Panicum repens											
Pontederia lanceolata							2		2		
Typha latifolia	2			3	1	1					
No other vegetation present	3	2	2		3			3		3	3
Bare bottom						3	1	1	1	1	1
Beach											
Substratum	4	3	2	2	3	2	1	2	2	2	2
Date of habitat change											

(Continued)

(Sheet 2 of 4)

Table B4 (Continued)

Habitat Condition	Trap Station 240	250	260	270	280	290	300	310	320	330
Eichhornia crassipes		3	1	1	1	1	1	1	1	1
Fuirena scirpoides										
Ludwigia peruviana	2	1	2		2	2	3	2	2	2
Nuphar luteum										
Panicum hemitomon										
Panicum repens										
Pontederia lanceolata										
Typha latifolia										
No other vegetation present	3			2	3	3		3		
Bare bottom	1	2	3				2		3	3
Beach										
Substratum	2	2	2	3	2	2	3	2	2	2
Date of habitat change										

(Continued)

Table B4 (Concluded)

Habitat Condition	Trap Station			
	340	350	360	370
Eichhornia crassipes	2	2		2
Fuirena scirpoides				
Ludwigia peruviana	3			
Nuphar luteum				
Panicum hemitomon				
Panicum repens				
Pontederia lanceolata				
Typha latifolia				
No other vegetation present		3	2	3
Bare bottom	1	1	1	1
Beach				
Substratum	2	1	1	1
Date of habitat change				

(Sheet 4 of 4)

Table B5

<u>Gatlin Canal</u>

Habitat Condition	Trap Station 0	10	20	30	40	50	60	70	80	90	100	110
Eichhornia crassipes		1	1	1						2	3	
Fuirena scirpoides												
Nuphar luteum		2	2	2	1	2	2	3				
Panicum hemitomon												
Panicum repens			3	3	3	2	1	1	1	1	2	2
Pontederia lanceolata										3	1	1
Typha latifolia							3	2	2			
No other vegetation present	2				3	3			3			3
Bare bottom	1											
Beach												
Substratum	2	2	4	4	3	2	2	2	3	3	2	2
Date of habitat change												

(Continued)

(Sheet 1 of 2)

Table B5 (Concluded)

Habitat Condition	Trap Station 120	130	140	150	160	170	180	190
Eichhornia crassipes	3				3	1	1	3
Fuirena scirpoides								
Nuphar luteum		3						
Panicum hemitomon								
Panicum repens	2	2	2	2	1			1
Pontederia lanceolata	1	1	1	1				
Typha latifolia					2	2	2	2
No other vegetation present			3	3		3	3	
Bare bottom								
Beach								
Substratum	2	3	3	2	2	3	3	2
Date of habitat change								

(Sheet 2 of 2)

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